

AIR CONDITIONING

Standard Methods for Rating & Testing Air-Conditioning Equipment

(Concluded from Page 13, Column 5)
ceiving chamber, and the other side connected in a similar manner to a static orifice in the wall of the nozzle discharge chamber shall be used to obtain the pressure drop across the nozzle. The static orifices shall be located so as not to be affected by the air flow.

(10) Temperature measuring instruments and their location shall be the same as in the Receiving Chamber Method with Impact Nozzle except that the outlet temperatures will be measured at the outlet of the mixing box rather than at the nozzle. A temperature reading at the nozzle shall be used, however, for calibrating the nozzle.

Testing Cooling Units

3. Apparatus Specifically for Cooling Tests.

a. Volatile Refrigerant Measurements.

(1) Pressure gauges shall be placed in the liquid line on the high pressure side of the refrigerant control and in the vapor return from the evaporator at that point where the unit ceases to impart heat to the vapor. A mercury manometer shall be used for pressure measurements below 30 lbs. per square inch absolute.

(2) Liquid and suction line temperature measuring instruments shall be placed so as to measure accurately the temperature of the liquid entering the refrigerant control and of the vapor adjacent to the suction pressure gauge connection respectively. The lines shall be insulated at, and adjacent to, the instruments.

(3) Refrigerant control to be used during the test shall be the same as is standard for the units.

(4) Suction pressure regulating valve may be located in the suction line ahead of the refrigerant compressor to control the suction pressure at the evaporator.

(5) Calibrated condensing unit shall be calibrated for the conditions under which it will operate during the air conditioning test, using the methods and apparatus specified in the Proposed Standard Methods for Testing Mechanical Condensing Units.

(6) Refrigerant quantity meter (alternate to item 5 above) shall conform to specifications in Proposed Standard Methods for Testing Mechanical Condensing Units.

b. Non-Volatile Refrigerant Measurements.

(1) Temperature measuring instruments shall be placed to measure accurately the temperature of the inlet and outlet liquid. The lines shall be thermally insulated at and adjacent to the temperature measuring instruments.

(2) A hydrometer shall be used to determine the specific gravity of the brine in those cases where a brine is used.

(3) A tank having sufficient capacity to accumulate the flow for at least two minutes shall be supplied. This tank shall be so located that the cooling fluid leaving the unit can be diverted into it.

(4) Scales shall be used for weighing the intercepted fluid.

(5) A flow meter may be used as alternative for (3) and (4).

(6) A mercury manometer shall be connected across the liquid inlet and outlet connections of a closed interchanger to measure the pressure drop.

(7) A pressure gauge shall be used to measure the spray pressure when a spray interchanger is used and a pump is not regularly supplied with the unit.

Tests on Heating Equipment

4. Apparatus Specifically for Heating Tests.

a. Steam Heating. The apparatus used in these tests shall conform with the specifications set forth in the ASHVE Standard Code for Testing and Rating Steam Unit Heaters.

b. Hot Water Heating. (1) Temperature measuring instruments shall be located so as to measure the temperature of the inlet and outlet liquid.

(2) A tank having sufficient capacity to accumulate the flow for at least two minutes shall be provided. This tank shall be so located that the heating fluid leaving the unit can be diverted into it.

(3) Scales shall be used for weighing the intercepted fluid.

(4) A flow meter may be used as alternative for (2) and (3).

(5) A mercury manometer shall be connected across the liquid inlet and outlet connections to measure the pressure drop through the interchanger.

Humidification Tests

5. Apparatus Specifically for Humidification Tests.

a. Water Measurements

(1) Water evaporation rate. Equipment shall be provided to measure by the most accurate means available depending upon the type of unit the weight or volume of water evaporated during the test. This measurement shall be made upon the water and shall not be obtained from the change in moisture content of the air except in the case so specified.

(2) Vessels may be used to separately intercept the water supplied and water wasted (if any), in cases where the supply and waste flow at a substantially constant rate.

(3) Scales shall be used for weighing.

(4) When measurement by weight is not feasible or is inaccurate, such as is possible in a pan type humidifier with float controlled make up, means shall be introduced to measure the decrease in volume or depth of the water in a gravity supply vessel when the supply is interrupted for a measured length of time.

(5) A calibrated orifice may be used for measuring steam sprays.

(6) Pressure gauge. Whether water is supplied from an external source or by a recirculating pump, its pressure shall be measured by a calibrated pressure gauge.

b. Heat Measurements. If a source of heat is required for evaporation the necessary equipment shall be furnished to determine the amount of heat required and information relating to the source of this heat such as steam pressure, hot water temperature, voltage, etc.

Testing Cooling Equipment

E. Testing Cooling Equipment.

1. Basis of Test. There shall be a primary test and a simultaneous confirming test made under the conditions specified in the Standard Basis of Rating.

a. Primary Test shall be used for rating. The sensible and the total cooling effects and the dehumidifying effect shall be obtained from the air capacity and the dry and wet bulb temperature drops through the unit. The air capacity shall be directly measured by one of the following methods:

(1) Receiving chamber with impact nozzle as specified in the "A.S.H.V.E. Standard Code for Testing and Rating Steam Unit Heaters." This method consists of discharging the air into a receiving chamber, in which the static pressure is maintained at zero by an exhaust fan for free delivery units. The outlet from the receiving chamber is a calibrated nozzle. The velocity pressure of the air passing through the nozzle is determined by an impact tube and manometer (draft gauge).

(2) Receiving chamber with static nozzle is one in which the air is discharged into a receiving chamber sufficiently large to eliminate all velocity pressure. The outlet from the receiving chamber is a calibrated nozzle. The difference in static pressure in the receiving chamber and nozzle discharge chamber is equal to the velocity head of the air through the nozzle and is measured by a manometer (draft gauge).

b. Confirming test of the total cooling effect shall be made by one of the following methods. The results of the confirming test must be within 5 per cent of those of the primary test, but the primary test shall govern the rating.

(1) Volatile refrigerant. The confirming test shall be made by means of a calibrated condensing unit or a refrigerant quantity meter.

(2) Non-volatile refrigerant. The confirming test shall be made by determining the heat absorbed by the refrigerant and is obtained from the rate of flow, specific heat, and temperature rise of the refrigerant.

Procedure for Test

2. Procedure.

a. Air Measurements.

(1) Temperatures. Obtain and maintain standard inlet air conditions. The arithmetical average of all dry bulb temperatures during the test shall not vary from the specified dry bulb temperature more than 1° F. The arithmetical average of all wet bulb temperatures shall not vary from the specified by more than 0.5° F. Individual dry bulb temperature readings shall not vary more than 2° F. from the specified, and individual wet bulb temperature readings shall not vary more than 1° F. from the specified. All wet bulb instruments must be in evaporative equilibrium when read. Wet bulb readings shall be corrected where air velocities are below 500 ft. per minute. All instruments on inlet and outlet air must be read to within 0.1° F.

(2) Air capacity measurements. The air capacity of pressure type units calculated from the test data and corrected to standard air as defined herein shall not deviate from the air capacity to be shown in the ratings by more than plus or minus 5 per cent. All readings on the air capacity and the leaving air temperature must be taken after condensation has built up to a constant amount so that the unit air quantity ceases to change. The exhaust fan for free delivery units shall be controlled so that static pressure in the receiving chamber as indicated by the static manometer (draft gauge) is maintained at zero.

(a) Receiving chamber with impact nozzle method. The velocity pressure manometer (draft gauge) shall be read each time a general reading is made and shall be read immediately before or immediately after the reading of outlet air temperature.

(b) Receiving chamber with static

nozzle method. A reading on the nozzle pressure drop manometer (draft gauge) shall be taken each time a general reading is made and shall be immediately preceded or immediately followed by a reading of the temperature of the air leaving the nozzle.

(3) Air resistances of interchangers and pressure type units shall be measured by at least one static pressure tube traverse, so made that a representative average of the resistance is obtained. The resistance of the cooling coil shall be taken when it is condensing water vapor at the rate occurring under the standard conditions of rating; that of the spray chamber shall be measured with the sprays in normal operation; and that of filters and screens shall be taken as twice that of clean filters or screens. At least one reading shall be taken for every square foot of cross sectional area, but in no case shall less than six readings be taken.

b. Volatile Refrigerant Measurements. After placing the refrigerating system in operation, set the refrigerant control to the superheat at which the unit is designed to operate. The suction pressure at the evaporator shall be maintained by means of the regulating valve at a pressure corresponding to the saturated vapor temperature specified in the standard basis of rating and shall be read within a pressure equivalent of 0.5° F. The instrument measuring the superheat in the suction vapor shall be read to 0.5° F. A record shall be kept of the suction pressure and temperature fluctuation extremes, and while deviation from the required suction pressure may be unavoidable due to normal cycling of the control device, the mean average temperature equivalent to the pressure shall not be permitted to deviate more than 0.5° F. nor the maximum more than 3° F. In no case shall the test be acceptable if liquid refrigerant floods through at any time during the normal cycling of the control device; and if such flooding should occur, the superheat shall be set sufficiently higher so that the flooding ceases.

c. Non-Volatile Refrigerant Measurements.

(1) Temperatures. Inlet and outlet liquid temperature measuring instruments shall be read to 0.1° F. The refrigerant inlet temperature shall not be permitted to vary more than 0.5° F. during the test.

(2) Specific gravity of the brine, if brine is used, shall be taken at the beginning and at the end of the test and the readings averaged.

(3) Refrigerant flow shall be measured by the weight method, a calibrated orifice, or a calibrated flow meter.

(4) Pressure drop shall be read by a mercury manometer twice during the test. Before reading it should be determined that the manometer is in balance and the connections are free from air. The manometer should be read to within 0.1 in. of mercury.

d. General.

(1) Spray pressure shall be measured every 10 minutes, when no pump is furnished with unit.

(2) Fan speed shall be maintained within plus or minus 2 per cent of rated speed and this speed shall be

measured at the beginning and end of the test.

(3) Watts input to the fan motor (and pump motor if any) shall be taken at the beginning and at the end of the test by a watt meter.

(4) Barometric pressure shall be read once during the test.

(5) Duration of test during which all conditions shall be maintained within the previously specified limits shall not be less than one hour. If readings fluctuate beyond the specified limits, the test shall be continued until the readings have been stabilized within these limits for a period of one hour.

(6) Readings shall be taken at least every 10 minutes unless specified to the contrary, and a total of at least seven readings shall be taken.

(To Be Concluded Next Week)

Pittsburgh Restaurant Installs Conditioner

PITTSBURGH — Donahoe's cafeteria-restaurant in this city was recently equipped with a year-around air-conditioning system, said to be one of the largest and most complete installations ever put into a concern of this kind. Installation was a project of the Danforth Co., Westinghouse dealer here.

Fresh air, brought in and cooled to a temperature of 14° F. below the outside temperature, and dehumidified to a relative humidity of 50 per cent, supplies the restaurant during the summer months.

In winter, fresh air, heated to a temperature of not less than 70° F. is supplied. Throughout the year there will be free circulation of air at the rate of 25,000 c.f.m., or a complete change of air every eight minutes. Air is filtered by passing through a double bank of filters.

Temperature control is entirely automatic, the refrigeration capacity of the cafeteria automatically increasing or decreasing to compensate for the change of air outside. Relative humidity is kept within comfort zones.

Thermostatic controls modulate the air to the desired temperature in winter heating. A low limit control prevents the admission of too cold air at any time, regardless of all other controls.

Donahoe's own artesian well supplies the water for cooling. The system, with its cooling capacity of 103 tons, equal to the melting of 206,000 pounds of ice per day, requires 125 gallons of water per minute.

Air-conditioning equipment was installed in 26 days. During this period Donahoe's business went on uninterrupted, and the architectural set-up of the restaurant was not marred.

Times Square Drug Store To Be Air Cooled

NEW YORK CITY—Air conditioning will be one of the features of a new unit of the Whelan Drug Stores, Inc., chain, to be established in a business building under construction on the old Criterion theater site, in the heart of the Times Square district at Broadway and Forty-fourth St.

Laboratory Control assures Absolute Dryness

The patented process employed in the production of EXTRA DRY ESOTOO removes every trace of moisture. Trained laboratory technicians check every step during production. EXTRA DRY ESOTOO represents as close a commercial approach to absolute chemical purity as can be attained by man.

Such precision methods do not fail to result in improved performance. V-METH-L is also produced under the same exact control.

For highest operating efficiency, specify these perfected refrigerants.

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West Norfolk, Virginia

F. A. Enstis, Secretary, 131 State St., Boston and 76 Beaver St., New York



Your Dealers Can Better Afford A Free Service Guarantee if you Specify VALVES and FITTINGS by Weatherhead

THE WEATHERHEAD CO.
620-714 Frankfort Ave., Cleveland, O.

REFRIGERATION NEWS

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Business News Pub. Co.THREE DOLLARS PER YEAR
TEN CENTS PER COPYAutumn Retail
Sales Reported
For 4 MarketsCleveland and Oklahoma
Show Gain; Kansas City
& Georgia Sales Down

Reports of household electric refrigerator sales just issued by distributor-dealer associations in two major metropolitan centers, and by two large operating utilities, show gains over 1934 in two instances, and slight decreases in the other two areas.

Marked gains were reported in Cleveland and in the territory served by the Oklahoma Gas & Electric Co.; while decreases were registered in Kansas City and in the area in which the Georgia Power Co. operates.

Cleveland Gain 66.7%

Cleveland distributors recorded a noticeable gain in October sales to dealers and consumers, the total being 982 units, as compared to 589 for October of 1934, an increase of 66.7 per cent.

Total sales by Cleveland distributors for 10 months total 21,983 units. This represents an increase over the 10 months total for 1934, declares Ralph H. Jones, secretary of the Electrical League of Cleveland.

Big Increase in Oklahoma

Sales of electric refrigerators by distributors and dealers through the first 10 months of 1935 in the towns served by the Oklahoma Gas & Electric Co. totaled 12,411 units, an increase of 20.7 per cent over the same period of 1934, and more than were sold in the entire year of 1934, reports A. A. Brown, sales manager for the utility.

The following is a month-by-month report of the sales of electric refrigerators in the territory served by the company:

January	335
February	479
March	1,668
April	1,798
May	2,120
June	2,076
July	1,947
August	1,224
September	443
October	321

The Oklahoma Gas & Electric Co. does not engage in merchandising activities, but cooperates with distributors and dealers in promoting sales.

"In previous years," says Mr. Brown, "we joined with various distributors in offering a prize of a week's vacation trip to electric refrigerator salesmen who made a certain quota."

"This year the plan was changed somewhat—no trip was offered, but merchandise prizes were put up."

"At the beginning of the refrigerator season, a catalog describing the plan was mailed to each salesman. This was mailed to his home rather than to his place of business."

"Each unit sold accounted for a certain number of points and various items of merchandise were available on a point basis. The expense of this was borne jointly by our company and the distributors. All salesmen's reports were verified by the distributor or dealer."

"The plan worked very well, as is indicated by the gains made over last year, especially in light of the fact that with the exception of the very small towns the saturation point on refrigerators is high in our territory."

"The salesmen, as a whole, seem to prefer this plan to any other, as it gives the men working in small towns, who have a very limited market, an opportunity to receive prizes in the form of merchandise commensurate with their sales."

"In order to sustain interest in this contest we mailed each salesman, at his home address, a copy of our 'Early Bird' publication, giving details of the contest and its progress at various stages of the season. The fact that most of the merchandise requested by the salesmen was for the home or for children indicated that we made no mistake in mailing these to the home."

Kansas City Sales Lag

Sales of household electric refrigerators to consumers in Kansas City during October totaled 319 units, as compared with 515 sold during the (Concluded on Page 2, Column 1)

G-E Distributors to
Preview '36 Line
Dec. 9, 10 & 11

CLEVELAND—The complete new 1936 line of General Electric home appliances will be previewed by General Electric distributors at their annual winter sales convention Dec. 9, 10, and 11 at Nela Park here, reports G. J. Chapman, manager of the company's specialty appliance sales division.

After inspecting the new line of G-E Monitor Top, Flatop and Liftop refrigerators, new ranges, dishwashers, workshops, kitchen waste units, laundry equipment, and cleaners, distributors will listen to a discussion of new product features and to plans for 1936 advertising and sales promotion.

Pre-showings of the new line will be held in 55 major cities from Dec. 16 to Jan. 16 under the sponsorship of distributors. To these affairs, dealers, department store and utility executives, architects, apartment house owners, realtors, builders, and others will be invited.

The G-E district manager and two men from the specialty appliance sales headquarters here will assist in the pre-showings in each of the various districts.

Following the distributors' gathering, the annual meeting for central station merchandise managers and holding company executives will be held at Nela Park Dec. 12 and 13. About 150 utility executives, representing companies operating in practically every state, will be present.

H. H. Bosworth, manager of central station activities, points out that the conference will stress load-building, and will discuss the following subjects: "Current Public Utility Questions," "The Industry's Position and its Future," "Central Station Responsibility in the Load-Building Program," "Unprofitable Customers," "Kitchen Modernizing Program," "Commercial Refrigeration," "Successful Sales Plans," "A Proven Sales Plan for Liftop Refrigerators," "Compensation for Retail Salesmen," "Financing Retail Sales," "Employee Selling," "Better Light—Better Sight."

This group will also witness a pre-showing of the 1936 line.

Maxon to Handle More
Of G-E's Advertising

CLEVELAND—Maxon, Inc., advertising agency, has been appointed to handle advertising for both the merchandising and specialty appliance departments of General Electric Co., following the consolidation of those divisions (ELECTRIC REFRIGERATION NEWS, Nov. 20).

The agency, which for many years has directed advertising of G-E refrigerators, ranges, dishwashers, and other kitchen appliances, will henceforth take over the added duties of promoting products of the Bridgeport, Conn., merchandise plant. These include home laundry equipment, radios, fans, vacuum cleaners, clocks, and small appliances.

Haller Is President of
Cincinnati Group

CINCINNATI—Carl Haller of Graybar Electric Co. was elected president of the refrigeration division of Cincinnati Electrical Association here recently. He succeeds Turner Barger of Bard & Barger.

Other officers of the association are: Matt Williams, secretary, and Guy Flaig, treasurer.

Philadelphia Service Men
Meet Dec. 5

PHILADELPHIA—The Electric Refrigeration Association, composed of independent refrigeration service companies of this city and surrounding territories, will hold its second annual banquet Dec. 5, 1935, states William Fahrback, president.

Pierce-Phelps Appointed
Airtemp Distributor

PHILADELPHIA—Pierce-Phelps, Inc., of this city has been appointed distributor of Chrysler Airtemp air-conditioning equipment.

Grunow Concern
Will Reorganize
Under '77B' LawFederal Judge Will Hold
Trusteeship Hearing
December 9

CHICAGO—Federal Judge P. L. Sullivan of the United States District Court here last week approved the petition of the General Household Utilities Co., manufacturer of Grunow household electric refrigerators and radios, which asked for the opportunity to reorganize under Section 77B of the Bankruptcy Act.

In approving the petition Judge Sullivan allowed the company to continue temporarily in control of its assets, and set Dec. 9 for hearing on whether or not trustees should be appointed to assume control.

The court refused to give the company authority to borrow \$250,000 to continue the business until creditors were notified and given an opportunity to express their views.

Only court actions in which the General Household Utilities Co. is involved, declares the petition, are those in New York on an alleged

Changes

Hays MacFarland & Co., advertising agency which has handled Grunow radio and refrigerator advertising, has relinquished the account; and it now has the business of the Stewart-Warner radio and refrigeration departments.

Blackett-Sample-Hummert, Inc., which formerly placed all Stewart-Warner advertising, is now restricting its efforts to the Alemitte division.

Duane Wanamaker has resigned as advertising and sales promotion manager of General Household Utilities, Inc., and shortly will embark on a South Seas voyage.

On his return he will set up an advertising counsel service, and it is understood that General Household Utilities will be one of his clients.

H. C. Bonfig, formerly vice president in charge of sales for General Household Utilities, has also resigned. Mr. Bonfig plans an ocean trip, too, after he has concluded some business transactions in Kansas City.

breach of contract filed by North American Radio Co., and in a U. S. District Court by the company against Motor Car Supply Co., Charleston, W. Va.

The petition requested that the General Household Utilities Co. be empowered to remain in possession and control of the assets, and that the court restrain all persons from instituting suits against it.

The company claims that it is solvent, but that present working capital is too small to meet obligations as they mature.

According to the petition, depletion of the working capital is due to (1) the necessity of carrying large stocks of refrigerators and materials in process and (2) advancement of credit to various distributors.

Assets of the General Household Utilities Co. were placed at \$3,551,424 with liabilities as of Oct. 31 totaling \$2,331,342. Included among the assets are land, buildings, machinery, and fixtures at \$1,507,600; accounts receivable amounting to \$1,041,461 (against which have been set up reserves of \$40,047); and inventory of \$1,027,347.

While patents and licenses are carried at \$1, these have been assigned to William C. Grunow, president of the company, as security against obligation as guarantor on certain debts of the company.

Liabilities listed consist of unsecured notes payable of \$283,087; trade accounts payable, \$647,238; past due U. S. manufacturers' excise tax, \$119,427; accrued salaries, \$89,875; state, local, and current Federal excise tax, \$103,210; royalties due Radio Corp. of America, Hazelton Corp., and Carrier Engineering Corp., \$115,740; loans owing Manufacturers Finance Co., \$463,357 (which loans are secured by trade acceptances and customers' accounts receivable); loans from Federal Reserve Bank, \$225,000; loans (Concluded on Page 2, Column 2)

Ice Spokesman Says
Government May
Make Units

CHICAGO—"While I was in Washington last week, I learned from reliable sources that some mention is even now being made in official circles that perhaps the Federal Housing Administration may purchase one of the well-known electric refrigerator factories for the purpose of manufacturing electric cabinets for its housing projects."

This statement, made by W. J. Rushton, vice president of National Association of Ice Industries, climaxed his address before members of the organization at their annual meeting here recently, in which he charged that recent administration moves have put the government in business in direct competition with the ice industry.

Tennessee Valley Authority, in its charter, is given the power to manufacture and sell refrigerators and other electrical appliances.

"If it is sound law for the government to use your taxes and mine to engage in the manufacture and sale of kilowatt hours, then, by the same law, it is likewise right and proper for the government to engage in the ice business, coal business, refrigerator business, or whatever business it will," Mr. Rushton declared.

The speaker charged the government with trying to ruin the ice industry, through discrimination in favor of electric refrigeration in its TVA and FHA projects.

(Concluded on Page 2, Column 4)

Mary Pickford Will
Star on Ice Industry
NBC Radio Program

CHICAGO—The ice industry will take to the radio and national magazines to sell its products in 1936.

At its recent convention in Chicago, the National Association of Ice Industries approved a \$500,000 advertising program for next year, headlined by Mark Pickford in an NBC radio program, "A Night at Pickfair," and including space in magazines of national circulation. The campaign will open about Feb. 1.

Theme of the campaign will be the slogan, "Cold Alone Is Not Enough," and prospects will be urged to see that "your new refrigerator is air conditioned." Donahue & Coe, New York City advertising agency, is handling details of the drive.

W. L. Chesman, vice president of the agency, asserted at the convention (Concluded on Page 2, Column 5)

Kelvinator Corp.
Reports Profit
Of \$1,199,445Earnings Equal \$1.05 per
Share; Declare 20c
Extra Dividend

DETROIT—Net earnings of Kelvinator Corp. for the fiscal year ended Sept. 30 totaled \$1,199,445.17, equivalent to \$1.05 a share, compared with \$1,203,430 or \$1.08 a share last year, President George W. Mason of the company reports, following a meeting of the board of directors here last week.

The earnings are after deduction of all charges, including taxes, depreciation, and engineering and development expense, the latter including substantial amounts for air conditioning. The company's proportion of the net earnings of Kelvinator of Canada, Ltd., are not included, however.

An extra dividend of 20 cents per share, in addition to the regular quarterly dividend of 12½ cents per share, was ordered by the directors.

President Mason declared that the company is spending approximately \$500,000 in making additions and changes to its plants in Detroit and Grand Rapids and for new equipment and dies.

Better Business Bureau
Warns on Misuse of
Term 'Air Conditioning'

NEW YORK CITY—National Better Business Bureau, Inc., headquarters here has recently issued a bulletin warning against misuse of the term "air conditioning" in the advertising and selling of products.

The bulletin points out that the Federal Trade Commission has already considered a case in which the term "air conditioning" was improperly applied, and that the Commission issued a statement bearing out the contentions which the Better Business Bureau makes in its bulletin.

The bulletin also calls attention to (Concluded on Page 9, Column 1)

Sam Horne Co. to Handle
F-M Line in Knoxville

KNOXVILLE, Tenn.—Sam Horne Co. of this city has been appointed exclusive distributor of Fairbanks-Morse refrigerators, radios, and home laundry equipment, officials of the firm disclosed recently.

Xmas Was Never Like This!



Mother wouldn't be the most pleased person in the family if these Santyettes hauled a new Frigidaire up to the kitchen door on Christmas. The girls are from Metro-Goldwyn-Mayer's "The Great Ziegfeld."

Sales Reported by 4 Retail Areas

(Concluded from Page 1, Column 1) same month in 1934, according to figures just released by G. W. Weston, secretary-manager of the Electric and Radio Association of Kansas City.

Sales through the first 10 months added up to 16,816 refrigerators, a decrease of 18 per cent from the total for the similar period in 1934.

Reason for the decrease, says Mr. Weston, is that the terrific heat and drought in this area last year made 1934 a record-breaking year for refrigerator sales.

Another reason for the low totals this fall, declares the association secretary, was that the Kansas City banks turned lukewarm on FHA modernization loans, which discouraged local dealers and salesmen. Recent opening of a First Bancredit Corp. office here will alleviate this condition, the dealers believe.

A number of refrigeration and radio distributors will exhibit in a special refrigeration and radio section in the Kansas City Auto Show which opens Saturday for a week's run in the new four million dollar air-conditioned municipal auditorium. The show will dedicate the new auditorium.

Refrigerators added to the lines of the Georgia Power Co. during the first nine months of 1935 totaled 8,730 units, as compared to the 9,214 units that went on its lines during the same period in 1934. Consideration must be given to the fact that the TVA promotion on low-priced refrigerators boosted sales last year.

During the same period this year 2,991 electric ranges were added to the power company's lines, as compared to 2,123 ranges in the first three-quarters of 1934.

Georgia Power Com'l Sales Over Quota

ATLANTA—Dollar volume of commercial appliance sales made by the Georgia Power Co. during the first nine months of 1935 totaled \$287,256, or 143.6 per cent of the \$200,000 quota set for the entire year.

Through September, commercial refrigerator sales totaled \$180,286, or over half the total dollar volume of commercial appliances sold.

Columbus led all divisions with 213.9 per cent of quota, followed by Rome with 186.8 per cent of quota. Water pump sales during the first nine months of this year totaled \$34,107, water coolers, \$61,260, and cooking appliances, \$11,603.

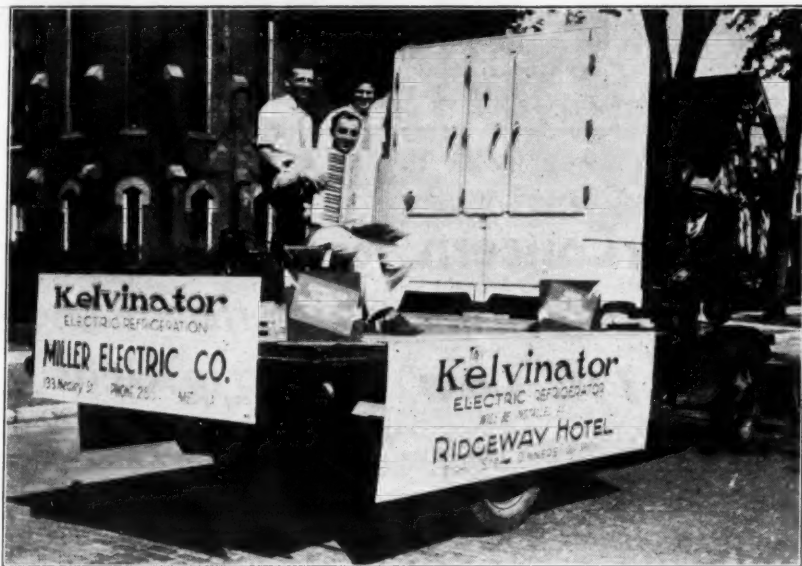
Morgan & Stanley Elected Directors of G-E

NEW YORK CITY—Henry S. Morgan and Robert C. Stanley were elected members of the board of directors of General Electric Co., at the meeting held here Nov. 1. At the same meeting, Thomas Cochran resigned from the board because of ill health.

Morgan, a son of John Pierpont Morgan, was until recently a partner in the firm of J. P. Morgan & Co., and is now a director and executive officer of Morgan, Stanley & Co., Inc.

Stanley has been president of International Nickel Co. since 1922, and represents various metal and petroleum interests in the United States and Canada.

A Little Parade for a Big Sale



When Bert Miller, Kelvinator dealer at Medina, N. Y., sold a 23-cu. ft. model to the local hotel recently, he staged a "one-man parade" through his territory before he delivered the unit. Three household and two commercial sales resulted from this novel bit of promotion.

Grunow Reorganizing Under Section 77B of Bankruptcy Act

(Concluded from Page 1, Column 3) from officers and directors due Sept. 1, 1936, \$258,981.

The petition declares that the company has \$1,709,400 in unfilled orders for household radios, and \$358,520 in orders for auto radios. Gross sales for the fiscal year ending July 31, 1935, were \$10,759,300, as compared with \$12,448,367 for the previous fiscal year. A net loss of \$1,736,057 was reported for the fiscal year ending July 31, 1935.

The petition to reorganize under Section 77B follows a third attempt of the General Household Utilities Co. to get additional working capital, a recent letter from Mr. Grunow to stockholders stating that negotiations were under way to obtain more working capital.

In April, 1934, the company obtained \$500,000 through loans from the principal stockholders. Later in the year a \$300,000 loan was obtained from the Federal Reserve Bank. Part of this loan has been repaid, according to figures revealed in the petition.

First Kelvinator Range School Held by Dealer

CONCORD, N. C.—What is said to be the first Kelvinator range cooking school ever held was sponsored here recently by Towel City Electric Co., Kelvinator dealer. Of 856 women who attended the three-day event, 108 were prospects for refrigerators, and 47 for ranges.

Three range and two refrigerator sales were a direct and immediate result of the school.

B. W. Pethel, owner-manager of the Towel City Co., plans to conduct a second school in Kannapolis, where he operates another store. Home economists in charge were Miss Alice Cooley of the Kelvin Kitchen, Detroit, and Miss Grace Johnston of Moore & Stewart, Gastonia, N. C.

12 New Distributors Are Appointed by Super-Cold

LOS ANGELES—Twelve new distributors—eight domestic, two Pan-American, and two foreign—have been appointed by Super-Cold Corp. of this city.

United States distributors are as follows: The Geo. L. Townsend Co., and the J. Belsky Fixture Co., both of Oklahoma City; Super-Cold Sales Co., Abilene, Tex., directed by W. K. Miller; Noah's Ark Mercantile Co., San Diego, Calif., directed by G. Neuman; O. R. Henney, Salt Lake City; Beecher-Cummings Co., Minnesota; I. W. Phillips Co., Florida; and the Cushing Refrigerator Co., Boston.

C. A. Chapman, Colon, C. Z., will handle sales in the Republic of Panama, and J. M. Barreto Coll, Caracas, in Venezuela, S. A. Foreign distributors are Kelvinator Australia, Ltd., Sydney and Adelaide, Australia, and H. R. Hendy, Johannesburg, South Africa.

Pollack's Opens Branch Store in Baltimore

BALTIMORE—Pollack's, a member of the Reliable Store Co., which operates a chain of stores handling refrigerators, ranges, and furniture, opened a branch store at 1000 S. Charles St., here recently.

New Jersey Crosley Dealers Seek Display Prizes

NEWARK—Apollo Distributing Co., Crosley distributor, is conducting a window display contest among Crosley dealers in New Jersey, with merchandise prizes amounting to \$500 offered.

New Lipman Distributor

GALESBURG, Ill.—The Luttrell Fixture Co. has been appointed distributor in this territory for Lipman refrigeration equipment by General Refrigeration Sales Co., Beloit, Wis.

Ice Industry Attacks Govt. Promotion on Electric Units

(Concluded from Page 1, Column 4)

As a result of the activity of TVA and its subsidiary, EH&FA, Mr. Rushton said, "in six short months of 1934 there was sold in only a portion of Georgia and eastern Tennessee alone, one-fifth as many electric refrigerators as had been sold in the whole of six southern states in the entire 12 preceding years by the combined efforts of utilities and all other dealers."

He also charged that TVA is further discriminating against ice manufacturers by charging them more for power than consumers are required to pay.

"As to the Federal Housing Administration," Mr. Rushton said, "on their own statement, they have yet to install any ice refrigerators anywhere, nor do they promise to do so."

"One large eastern concern not only offered to furnish for such a project first quality cabinets at a figure of \$15 each (several dollars below the price to be paid for this merchandise), but further offered to guarantee the cabinets, to service and repair them free of charge for a 15-year period."

"In addition, this company agreed to contract to furnish ice for 10 years at a price less than its usual retail schedule, provided the government would pay the monthly bills for it. Yet that ice company did not secure the contract. It will go to electric refrigeration, at an enormously higher investment of taxpayers' money."

Mr. Rushton said that TVA and FHA activities, especially in the southern states, "have already driven domestic electric rates in many localities so low that they will unquestionably lead ultimately to the bankruptcy of the utilities, which will provide greater opportunity for the Roosevelt administration to seize them."

"What is of more immediate concern to ice men in these localities, in the meantime, is the fact that these schedules provide the domestic consumer with rates per kilowatt hour that, in some instances, are as low as those charged the ice companies, which are large wholesale users of electricity."

"Such New Deal activities as these are a far greater menace to our industry . . . than any utility propaganda or merchandising program ever was, or ever can be," he concluded.

Mary Pickford to Star On Ice Industry's Radio Program

(Concluded from Page 1, Column 4)

that of the 26,000,000 families in the United States, some 75 per cent still depend on ice for refrigeration. Many commercial organizations, such as the Liggett drug chain, are returning to ice after experiments with electric refrigeration, he claimed.

The ice industry's magazine campaign will include full pages in color and full and half pages in black and white. Copy will assert that dry cold robs food of flavor, and that ice is the perfect refrigerant because of its humidity, and because when it is used the odor of one food cannot taint another.

Modern ice refrigeration, it will be pointed out, is economical and efficient, and there is nothing to get out of order.

The national advertising campaign, already financed for six months and planned as a long-time effort, is the ice industry's answer to recent allegations that it was of "the horse and buggy era," "of the tallow candle age," and that it was an "obstructionist in the way of progress."

Backing the national campaign will be local drives, tied up with the "Cold Alone Is Not Enough" theme, and financed by the ice companies and dealers immediately concerned. This local material is available through Ice Refrigeration Bureau, Detroit, of which "Shad" Lawler is head.

The radio program, "A Night at Pickfair," will portray Miss Pickford as playing hostess to other guests in her living room, and will permit a variety program of entertainment.

Fairbanks-Morse Holds Preview for Officials Of 1936 Line

CHICAGO—The Fairbanks-Morse line of electric refrigerators for 1936 was shown to officials of Fairbanks-Morse Home Appliances, Inc., at a private preview here recently. Features of the new models will be centered around the F-M Conservador, which the company introduced in 1935.

The line will be shown to distributors early in January in a preview meeting in Chicago, at which advertising and merchandising plans for the year will also be presented.

WOLVERINE COPPER TUBING for REFRIGERATION

EXTRUDED from 99.9% pure deoxidized copper, Wolverine Refrigeration Tubing is strong, close grained and has the characteristic Wolverine Mirror inside finish. Dimensional accuracy assures perfect joints with all soldered and flared type fittings.

All dehydrated tubing is solder sealed with the Wolverine W . . . furnished both plain and tin plated.

The service man may obtain Wolverine tubing in securely wrapped coils . . . a convenient package which adequately protects the tubing and keeps it perfectly clean until used.

Wolverine deoxidized water tubing is a favorite for air-conditioning work . . . conforms to A.S.T.M. and Government specifications in types "K", "L" and "M", furnished in both hard and soft temper.

Your local refrigeration supply jobber has a stock of Wolverine Tubing.



WOLVERINE TUBE CO.

SEAMLESS COPPER BRASS & ALUMINUM

1411 Central Ave.

Detroit, Mich.

"AN OLD NAME IN A YOUNG INDUSTRY"

CURTIS

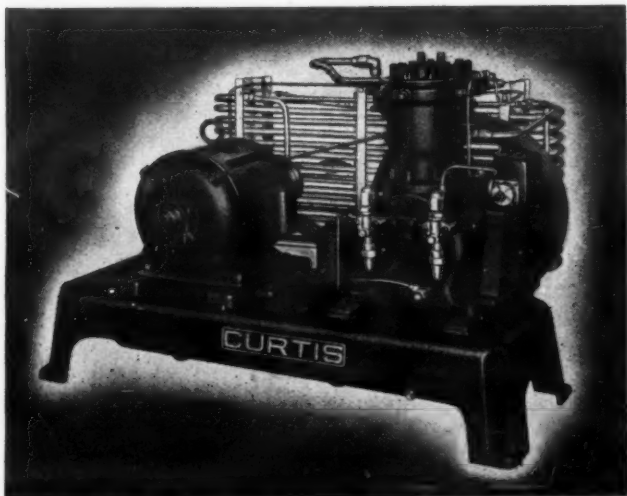
Specify CURTIS and be sure

ELECTRIC REFRIGERATION AND AIR-CONDITIONING UNITS

The sure way to satisfaction from a refrigeration or air-conditioning installation is to be certain that its most vital part—the condensing unit—is built by Curtis. Their constant, trouble-free performance is the result of 41 years' specialized experience in building fine compressors.

Complete Line—59 Units • Extra Capacity • Slow Operating Speed • Experienced Design • Low Upkeep • Rugged Construction • Fine Materials and Workmanship

Curtis enjoys the highest capital and credit rating—a Curtis product won't become an "orphan".



CURTIS

Curtis Refrigerating Machine Company
Division of Curtis Manufacturing Co.
1912 Kienlen Avenue — St. Louis, Mo.

SPARE THAT PENCIL

MR. DEALER



"SIM" CAN GIVE YOU THE ANSWER IN THIRTY SECONDS

● The Westinghouse SIMPLOGRAPH — "Sim" for short — is an ingenious, new estimating device that greatly speeds up the selling of commercial refrigeration. In a matter of seconds it tells you exactly the best condensing unit and coils to best meet your prospect's requirements. It saves time; it simplifies your selling. And you can *depend* upon its recommendations, because they have been worked out by Westinghouse Master Engineers, with due allowance for all variable conditions.

MORE PROFIT WITH WESTINGHOUSE

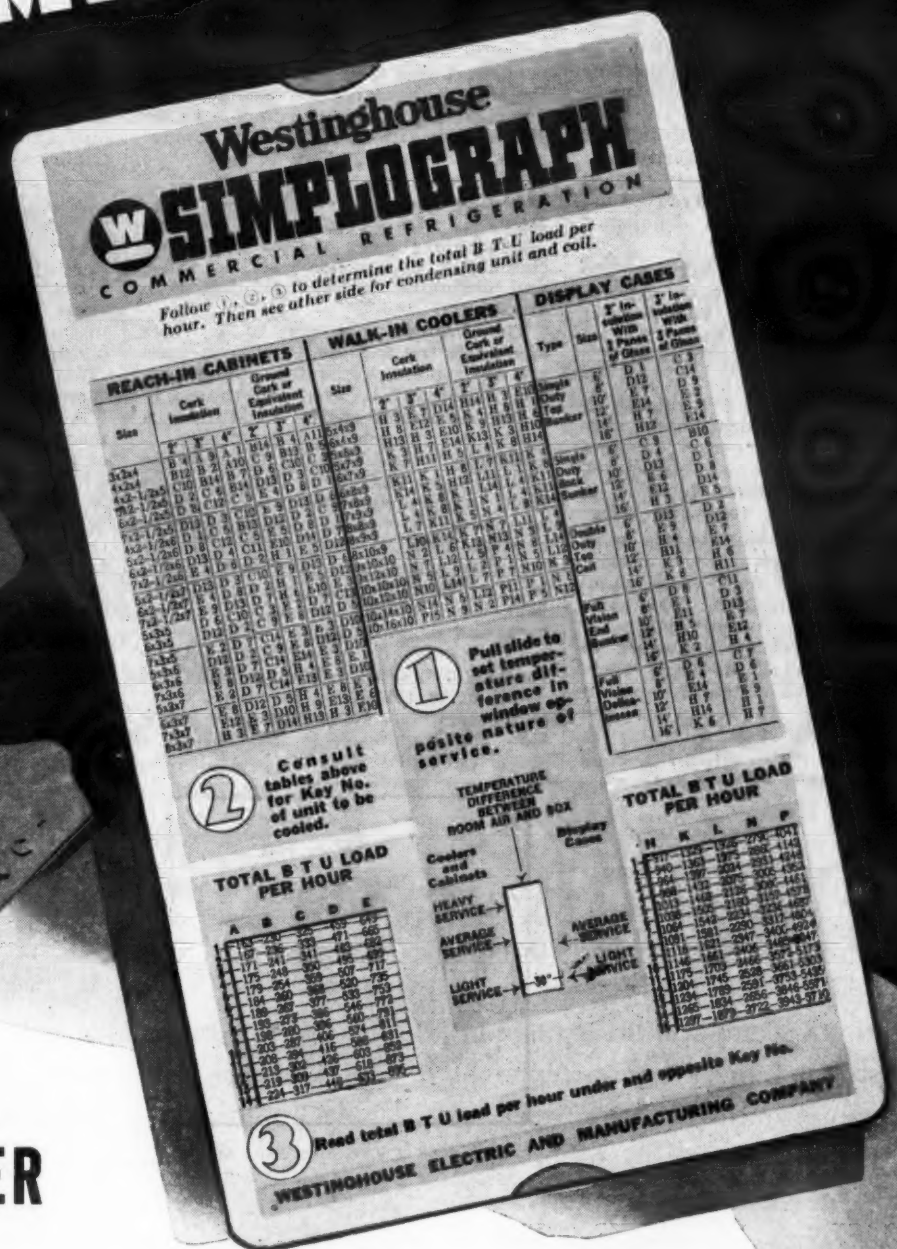
Simplified selling with "Sim" is only *one* of the advantages you enjoy with Westinghouse Commercial Refrigeration. Hermeti-

cally-sealed and open-type condensing units, plus coils of all sizes and styles, plus the popular Westinghouse Water Coolers, make the line complete... a money-maker for any aggressive dealer. Moreover, you can sell Westinghouse equipment with confidence, at less cost and with *greater net profit*.

GET THE FACTS

Write today for full information about Westinghouse *Simplified* Refrigeration and the SIMPLOGRAPH selling aid. There's real money to be made in Westinghouse "Commercial." Get the facts without delay. Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

Distributor opportunities are available in a few major cities. Write for information.



Westinghouse COMMERCIAL REFRIGERATION

Careful Study & Investigation Needed in The Selection & Training of Salesmen

Selection and Training Of Salesmen

Authors: H. G. Kenagy and C. S. Yoakum. Publisher: McGraw-Hill Book Co., New York. Pages: 370. Review by Frances McNamara.

BECAUSE of the human element and other variable factors, selling has not yet reached the standardization typical of production processes. In the profession of sales management, emphasis must be placed on the problem of developing sales personnel through specialized attention to selection, training, and supervision of salesmen.

Generally speaking, Messrs. Kenagy and Yoakum claim, a good sales organization is one which has a system of distribution suited to the product, the customer, and the personnel of the company. What this highly useful book does is present tested methods of arriving at a fitting plan of organization.

An organization chart in a sales organization should be found especially helpful, for it represents visually not only the division of functions among departments and employees but also their relationships. The successful organization chart should indicate the limits of authority and responsibility; point out group related activities; differentiate between duties; and convey the impression of unity of effort.

Home office organizations may be divided roughly into three types—geographical, functional, and product sales management. The type of management usually depends on the product sold.

Most companies are centralized in control. Such centralization is supposed to result in reduction of overhead and standardization of personnel. One type of centralized control is conducted along the following lines:

The field organization begins with district sales managers. Each district manager has four field sales managers under him. Each field sales manager supervises five division managers, and the division managers in turn have five retail salesmen each. Each salesman has a definite amount of daily work to do and a planned schedule for such work.

Another type of centralized field

organization is the company which sells through independent jobbers and company owned and operated branches, but employs a staff of salesmen to work in these territories.

Companies operating under decentralized control usually hold their division managers responsible only for total results achieved, and let them get business in their own way.

With regard to the question "Should Salesmen Have Definite Territories?" Messrs. Kenagy and Yoakum seem to be of the opinion that it is not wise to have two or more salesmen working the same territory, even if they have been trained to represent the company according to standard, routine plan.

The only conditions, claim the authors, under which salesmen might be able to work the same territory successfully is when they follow each other at definitely stated intervals, strictly refuse to meddle with one another's business, and refer all doubtful points to the home office.

Sales research is receiving growing recognition as an important factor in the sales organization. To fulfill its function properly, the sales research department should occupy an independent position in the organization. It should be able to maintain a detached point of view, uncolored by direct connection with sales operations.

The sales research department is essentially the problem-solving department. In the words of the authors, "it gathers a mass of data, tabulates, classifies, determines relationships, and evaluates results, seeking truth always."

The branch manager of a sales agency is the key man between good and poor policies and field conditions. His job should be analyzed thoroughly to determine what constitutes a successful branch manager.

Kenagy and Yoakum report the results of an analysis of facts obtained from interviews with branch managers of 10 office specialty sales organizations. A complete job analysis, they write, will help solve problems of branch managers concerning selection, training, measures of success, and organization.

This study, although containing limited data, throws some light on solutions of the above problems.

For instance, with regard to selection, the study reveals that the most important qualifications seem to be

the ability to: "(1) get men to work; (2) hire high-grade men; (3) train them; (4) help them close deals; (5) analyze the salesmen's weaknesses; (6) shift his attention to the various phases of his job; (7) analyze the sales possibilities in his branch territory; (8) plan ahead; (9) participate in the social affairs of business men; (10) avoid unnecessary expense in managing his branch office; (11) keep systematic records; (12) try out new ideas; (13) write sales letters."

Through scientific investigation and analysis it is possible for the sales manager to discover his most profitable method of securing applicants and his best source for recruits. Analysis of adequate records, such as application blanks and efficiency standards, would show whether inside experience is a favorable factor for success or what type or types of experience are best, etc. Selection could then be made accordingly.

With regard to significance of previous occupation, the authors conclude from studies of occupational groups from the standpoint of turnover, lengths of service, per cent of dealers sold, and per cent of quota sold, that the following is the order of occupational importance:

"1. Professions. 2. Business for self. 3. Retail selling. 4. Outside selling. 5. Clerical. 6. Minor executives. 7. Trades."

Statistics show, however, that men recruited from the professional fields serve a comparatively short time. This would automatically rule this class out, and since minor executives and trades should not be used extensively as a source of salesmen, the four middle groups are the most valuable sources for recruits.

Scientific analysis should also be applied to the interview method of selecting salesmen. Many sales managers believe in their ability to size up men, but unless founded on facts obtained from previous records, such "snap" judgments are really no more than hunches or guesswork.

A detailed record of the judgments made at the time each salesman is employed should be kept. Later on, when the salesman succeeds or fails, it is possible to refer to the interview record to see what the sales manager thought of him when he was hired. In this way, the selective machinery may be refined.

From studies made, the authors believe that personal estimates are of little value in selecting the salesmen. They believe standard selection methods develop a definite grading or scoring method which will add to the accuracy in sizing up an applicant. Messrs. Kenagy and Yoakum give an

Sales Idea of the Week

By V. E. (Sam) Vining, Director of Department Store Sales, Westinghouse Electric & Mfg. Co.

Did you ever watch a woman read a newspaper?

A man reads the front page, the sports page, the market quotations, the editorials, the funnies—and is satisfied.

Watch your wife. She reads the advertisements.

She has two things in her mind. First, the list of things she needs right now, and second, a list of things she may want in the future.

She is the world's greatest purchasing agent, and the advertisements are her means of keeping abreast of her job.

A man is affected by impressions—a woman wants details.

The man is a casual purchaser; the woman a professional—and knows her business.

She decides what part of town you will live in, what rent you will pay. It is her budget that provides food, clothing, luxuries, and the all important "left-over" purchasing power.

She knows what she wants and she has the money to pay for it.

Yet—

There seems to be a conspiracy among certain types of salesmen and copywriters to treat her as though she still believed in Santa Claus.

When you have something to sell a woman, tell her about it. Be direct—don't beat around the bush.

Don't try to kid her into believing you are merely "demonstrating"—or "taking a survey"—she's three jumps ahead of you—

All the time.

Some Big He Man may doubt all this, but the chances are his wife tells him when to get a hair-cut just the same.

illustration to show how the application blank could be statistically treated.

With a standardized program of selection, each item on an application blank would have some significance in separating good sales material from poor. For instance, personal history facts, age, selling experience, schooling, etc. would each mean some particular thing in estimating the applicant according to a standard rating scale.

Although research on personality and aptitude tests as an aid in selecting salesmen is now being conducted, no sure methods of evaluating personality have yet been found.

However, studies are being made in an attempt to answer such questions as: "What personality qualities are associated with particular occupations?" and "When the personality differences are known, what are the practical applications?"

Next to selection, training of the salesmen selected is most important in developing an effective sales organization. Each manufacturer should give its salesmen specific help in each step of the selling job, for a salesman not only sells the goods of the manu-

facturer, but represents its sales and service policies.

Salesmen should be trained so that they are equipped not only to sell the dealer, but also to help him solve his merchandising problems.

In getting material for the training course, a detailed investigation of the selling job from the standpoint of difficulties actually encountered by the salesman should be made.

When problems have been listed and ranked, a careful analysis of company experience should be made. To do this, methods used in handling each difficulty should be collected from salesmen, supervisors, and executives. These methods which have been actually used in the field are then in terms of actual operations rather than rules or principles.

Supervision is the process of helping a salesman to improve in the things in which he is weak. The supervisor must check the salesman's work in detail, discover his weak points, and help him overcome them. Essentials of proper supervision include a printed manual (giving the duties and methods of successful salesmen), training of supervisors, and a definite system of supervision.



Century 1-1/2 H.P. Single Phase Motor

In Step with All Phases of Engineering and Sales!

The conspicuous part played by Century Motors in the development of Electrical Refrigeration has been achieved and maintained by always keeping in step with all the important phases of engineering—AND SALES... "The buyer must be satisfied!"

This policy is simply good business on Century's part...

Isn't it equally good business on your part to consider its value to you?

Find out about Century Motors—Up to 600 Horse Power.

Century

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Mo.
Offices and Stock Points in Principal Cities

MOTORS UP TO 600 HORSE POWER

Copeland Commercial REFRIGERATION UNITS...

ALL MODELS WITH CYLINDER

METHYL CHLORIDE

SULPHUR DIOXIDE

COPELAND REFRIGERATION CORPORATION
1000 Avenue of Lincoln
DETROIT, MICHIGAN

Send for YOUR COPY!

Now Ready!

New POCKET EDITION CATALOG

COPELAND

Commercial REFRIGERATION

THIS handy 24 page catalog, just off the press, covers the entire Copeland line of commercial units. It contains specifications, capacity tables and application data that tells at a glance just which unit is best suited for the installation in mind.

The big line of Copeland Commercial Units is growing fast. This book contains them all. It is convenient pocket size.

The supply of these books is limited. They are FREE while they last. Write for your copy at once.

COPELAND REFRIGERATION CORPORATION
Manufacturers of a complete line of Household and Commercial Refrigeration
Holden Ave. at Lincoln... DETROIT, MICH.

Copeland
DEPENDABLE Electric REFRIGERATION

Radio Manufacturers Oppose Ban on Auto Radios in St. Louis

ST. LOUIS—The Radio Manufacturers Association, in cooperation with radio distributors and dealers in this city, will fight the adoption of an ordinance to prohibit automobile radios in this city.

This ordinance, introduced to the Board of Aldermen by Alderman John J. O'Connor, has the support of Major A. J. Lamber, member of the St. Louis Board of Police Commissioners. It was introduced as a safety measure, on the grounds that accidents are caused when the attention of drivers is diverted by programs coming from their automobile radios.

Bond P. Geddes, executive vice president of the RMA, states that a public hearing on the question has been requested, and the association has received official assurance that it will be granted. The RMA defeated a similar measure brought up in Connecticut in April, 1935.

This law would effect not only St. Louis residents, but also visitors from other parts of Missouri, and from out of the state.

Hayco Offers to Buy Certain Majestic Property Rights

CHICAGO—Frank M. McKey, trustee in bankruptcy for Grigsby-Grunow Co., has received an offer of \$20,000 from Hayco Corp. for certain property rights in the company, including good will, franchises, patents, trademarks, trade names, copyrights, and the right to use the names "Majestic," "Majestic Radio," "Majestic Radio Tubes," and "Majestic Phonograph."

The offer also asks for use of the company's list of customers, distributors, dealers, and orders on hand.

Mr. McKey's sixth report as trustee of the Grigsby-Grunow Co. showed total receipts of \$2,738,868.94, disbursements of \$1,976,851.46, and a balance on hand of \$805,241.39. Isaac B. Lipson, attorney for the defunct organization, has also filed a bill for \$12,500 for his services. This is in addition to the \$7,500 fee paid to him previously.

A hearing on the trustee's report as well as on Mr. Lipson's petition for fees, and the Hayco Corp.'s offer will be held at 11 a. m., Dec. 3, in Court Room 1802, 7 South Michigan Ave. before Referee-in-Bankruptcy Wallace Streeter.

Gibson Plans 'Preview' In 3 Cities in December

GREENVILLE, Mich.—Gibson Electric Refrigerator Corp. will conduct a series of distributor "preview" meetings in New York City, Chicago, and San Francisco, the first three weeks in December, to introduce its 1936 line, reports L. E. Taufenbach, sales manager.

New design, new sales policies, an enlarged consumer advertising program, and dealer helps will back sales of the five-model Gibson line for 1936, states Mr. Taufenbach.

"Total sales of this company for the fiscal year 1935-36 are three times greater than those for the same period in the previous year," he declares.

Kissner Added to Staff Of Warren Norge Co.

NEW YORK CITY—Art Kissner, Jr., has joined the sales staff of the Warren Norge Co., Inc., states E. L. Frohlich, sales manager.

Previous to joining this company, Kissner was Brooklyn representative of the Bushwick-McPhilben Corp., Spartan distributor, for 13 years.

Hammond Heads Graybar Office in Birmingham

BIRMINGHAM, Ala.—A. D. Hammond has been appointed successor to W. R. Phillips, retiring manager of the Graybar Electric Co., offices here. Phillips occupied this office for 35 years.

Hammond was formerly salesman of Graybar's Miami office, and later merchandise manager of the Atlanta Graybar branch.

Distributor Triples Radio Sales Over Last Year

INDIANAPOLIS — Kiefer-Stewart Co., Crosley distributor, sold three times as many Crosley radios up to Nov. 1 as this company has moved in any previous entire year.

In one week more than 500 Crosley sets were sold, declares H. C. Green of the radio department. There is a marked increase in the demand for higher-priced models, says Mr. Green.



He looks good...
BUT HOW WILL HE FINISH ?

Praise the looks and lines of horse, dog or yacht as much as you please—there is a hidden quality that determines results at the finish.

In manufacturing and merchandising to the public of America, appearance alone will not turn the trick. The article must deliver the goods. Quality must be there. It may be speed, comfort, convenience, or economy. Whatever it is the Consumer wants it, and woe to the maker who substitutes cheapness for quality.

in a refrigerator

The quality of an electric refrigerator rests in the hidden parts beneath the shiny finish. One of these important parts is insulation—for without quality insulation both manufacturer and buyer run the useless risk of high operating costs.

Ten years ago insulation was some-

thing to fill in with. Today it is a distinct engineering feature. For today we know there are three "dimensions" by which to judge insulation. They are: Thermal efficiency, Resistance to water vapor, and Permanence.

With these three factors, insulation will help maintain low operating costs.

Dry-Zero Insulation makes a continual saving of 30 cents to \$2 a month in running costs

The refrigerator insulated with Dry-Zero uses fewer k.w.h. per 24 hours. This is the direct result of Dry-Zero's qualities—its high insulating efficiency, its ability to resist water vapor, its permanence.

The results of exhaustive study on refrigerator insulation problems made by Dry-Zero Laboratory are available for your analysis. You are invited to ask for the report entitled "Effect of Insulation on Refrigerator Operation."



DRY-ZERO
REG. U.S. PAT. OFF.
**THE MOST EFFICIENT
COMMERCIAL INSULANT KNOWN**

DRY-ZERO CORPORATION
222 North Bank Drive Chicago
687 Broadview Ave. Toronto

PERSONALITIES

By George F. Taubeneck

On the Air

A number of retail sales managers have written us that they read editorials from *ELECTRIC REFRIGERATION NEWS* to their salesmen at morning meetings. And not infrequently a manufacturer or distributor reprints an editorial, and mails it out to an entire field organization.

It is the earnest hope of this department that manufacturers, distributors, and dealers will all find material in these editorials which can be used directly to promote sales.

Much thought and labor goes into their preparation, and many of them are written for the express purpose of providing fodder for salesmen and sales managers.

Recently a new use of these editorials was brought to our attention by JAMES W. BECKMAN of the Crosley Radio Corp., who reports that excerpts from the editorial on Christmas selling in the Nov. 6 issue have been read in broadcasts over WLW. These excerpts will also be read in programs broadcast from station WSAI to Crosley dealers.

Because these same excerpts might be found useful by local dealers in "spot" broadcasts (and also because we feel pretty good about it) we're quoting them here, just as they have been read over WLW:

"Food bills are generally higher in winter than in other seasons of the year," says an editorial in *ELECTRIC REFRIGERATION NEWS*, trade paper of the electric refrigeration industry, pointing out that they are apparently going to be higher this winter than they have been for a long time.

"The editorial says:

"The savings and economies which can be effected with an electric refrigerator of ample capacity (by quantity purchases, taking advantage of bargain sales, and by eliminating food wastage and spoilage) should be especially welcome this winter to all families which are watching their expenditures closely."

"Suppose you let your Crosley dealer tell you about this and show you that a Crosley Shelvador not only will cost you nothing, but actually save you money."

A second announcement referring to a News editorial was broadcast as follows:

"Colds, coughs, and diseases of all kinds are more prevalent in winter than in summer. During cold spells it pays especially well to take every precaution in protecting the family's health. Well-kept food is one of the important precautions and means of protection. *ELECTRIC REFRIGERATION NEWS* points out.

"Reducing the number of times the housewife has to slush around in the cold air and snow (with the larger sizes of refrigerators, shopping trips can be cut to a minimum—a week's supply of perishable foods can be purchased at one time) cuts down the number of dangerous exposures to which 'mother' must be subjected," says the editor.

"Money saved on doctor's bills by an electric refrigerator may far overshadow the cost of the refrigerator itself."

"It's just good business, as well as thoughtfulness for 'Mother' to stop in and have your Crosley dealer send over a Shelvador. You can name your terms, too."

Formula for Longevity

JOSEPH L. BAKER, founder of the Baker Ice Machine Co., Omaha, reached his eighty-first anniversary Oct. 11. He spent the day at his office as usual, and declared he never felt more fit.

"Yes, I took my 10 minutes tap dancing before going to my work," Mr. Baker told CHARLES P. RODMAN, who in turn wrote us about it. "I do that daily, and it keeps me as fit as a fiddle."

Mr. Baker attended the Minnesota-Nebraska football game the next day. The "ice machine" he designed now sells in 53 countries.

Another Anniversary

Senator and Mrs. F. B. CONNELLY will celebrate their Golden Wedding anniversary at Billings, Mont., on Dec. 1, when 28 children and grandchildren will visit them, writes our old friend, KENNETH CONNELLY.

The same date marks the fiftieth anniversary of Senator Connelly's founding of the distributing business (including General Electric and Grunow refrigerators) from which several corporations bearing his name have evolved. These are the F. B. Connelly Co. with branches at Seattle, Portland, and Spokane; the Connelly Machinery Co., with houses at Billings and Great Falls, Mont.; and the Connelly Acceptance Corp. at Seattle, of all of which he is president.

A couple of years ago the writer spent a delightful week in Cuba with Senator Connelly and his able son, Kenneth, and at that time formed a lasting admiration for them. Should anyone wonder why electric refrigeration has become the merchandising wonder of the industrial world, all they need to do is become acquainted with some of the leading distributors—men like the Connellys—and they will have their answer.

That's a Long Time

While we're on the subject of long service with one company, JACK SCHAEFER (who used to be with us here at the News) recently wrote us about a banquet he attended which impressed him very much. It was the sixth annual meeting of a unique industrial organization, the 25-Year Club of the York Ice Machinery Corp.

The meeting was attended by more than 300 "old timers," men who have a record of 25 or more years of continuous service with the company and totaling an aggregate of 9,000 years of service with York.

A group of 29 "new" men (mere children!), including E. A. KLEIN-SCHMIDT, vice president, and a number of outside branch men, were initiated as new members. Service emblems of a more advanced order were given to members who had completed 35 and 40 years with the company.

A feature of the meeting was the presentation of a 35-year service emblem to W. S. SHIPLEY, president of the company, by L. S. MORSE, president of the club and an executive engineer of the company. Mr. Shipley then presented Mr. Morse with a 40-year emblem.

The Marriage Fever

The abovementioned JACK SCHAEFER, who is one of the world's better guys, recently took unto himself a bride, who was Miss WANDA CARROLL of Kansas City.

Jack met Wanda at the A.S.R.E. convention in Kansas City in the spring of 1931. Wanda was the queen of the banquet down there, and we'd have enjoyed drawing her for a dinner partner, too, but Jack always was the better man in such circumstances.

During the intervening period Jack had few opportunities to see Wanda, but kept her interested with his letters, and finally sold her by mail on the idea of becoming Mrs. Schaefer.

It was one of the most successful direct mail campaigns that this department has on record.

Being a bachelor used to be fun in the refrigeration industry, for one had plenty of first-rate company. But, as was remarked on this page in the Nov. 6 issue, there has been a regular wedding craze—something akin to mah jongg, or crossword puzzles, or chain letters, or the flu—sweeping the country this fall, and now there are practically none of us left.

Pretty soon a bachelor will be as extinct as a dodo. (The writer hereby offers his body to the Smithsonian Institute to be stuffed, placed in a glass case, and marked: "Genus homo sapiens, species bachelor. Once roamed North America freely and in great numbers; species wiped out by marriage epidemic of 1935. This specimen last of his race.")

In our Nov. 6 dissertation on this sad subject, it was mentioned that JOHN WYLLIE, sales manager of Temprite, was one of the few remaining survivors. Imagine our surprise to receive the following letter, signed by John, from a Bermuda hotel:

"The new Mrs. Wyllie and I were greatly amused to read in your column that I was one of the last of the bachelors. Now perhaps you know why I was so anxious to get that back copy of the News in which you told all about Bermuda."

Nor is that the end of the story. Just last night we learned about another defection from the ranks: J. C. CHAMBERS of Chrysler Airtemp, formerly Frigidaire's air-conditioning sales manager. There was one gentleman we'd have sworn never would leave us. Now if WALTER DAILY, president of the advertising agency bearing his name, and former advertising and sales promotion manager of the G-E refrigeration department, succumbs to this malignant plague, we give up.

Off to South Africa

A. G. LINDSAY, manager of the foreign division of the Crosley Radio Corp., writes us that a 20-car train of Crosley Shelvador electric refrigerators left Cincinnati for New York last week for shipment to H. Pollack & Co., Ltd., Crosley distributor in South Africa, with distributing points at Johannesburg, Pretoria, Capetown, Durban, Maritzburg, Port Elizabeth, and Bulawayo.

"This is one of several equally large export shipments of electric refrigerators for South Africa this season," Mr. Lindsay writes. "Crosley Shelvador electric refrigerators have been making as rapid gains in South Africa as they have in the United States since their introduction.

"In Europe, from Gioraltar, Rome, Bucharest, and Constantinople, in the South to the northernmost markets of Sweden and Iceland, electric refrigeration is meeting with widespread acceptance.

"Our exports are equally active to Latin America, Australia, New Zealand, India, China, Japan, etc., and even to such far removed territories as the Congo, Sudan, Senegal, Gold Coast, Sierra Leone, Somalilands, Togo, Nigeria, Tanganyika, Ivory Coast, Cameroun, Madagascar, Reunion, Fiji Islands, Borneo, New Caledonia, Hebrides, and Papeete.

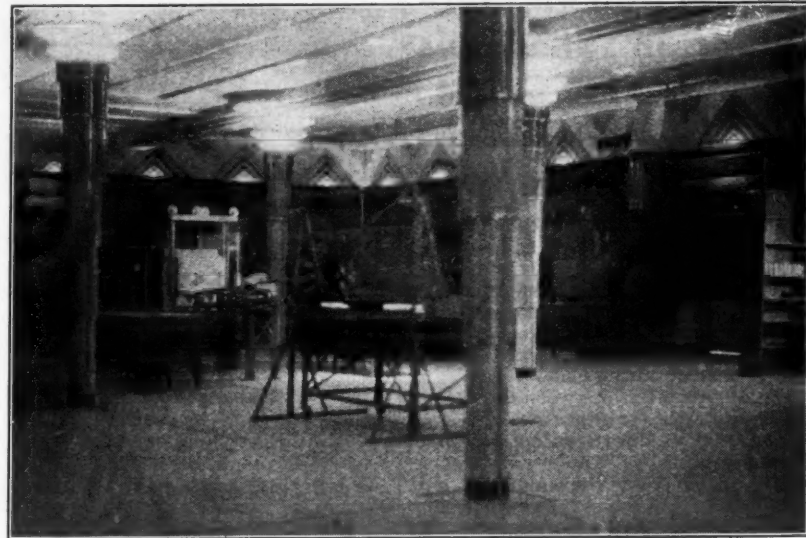
"No matter where you go on your round-the-world trip, you are almost sure to run into some refrigeration activity."

Congo, Too

Mr. Lindsay also reports that throughout the Congo, the enormous Belgian Colony in central Africa, electric refrigerators are finding widespread sale acceptance.

"Our distributor there reports that among the more important customers, the Governor General of the colony owns a Shelvador No. 70 as does the next highest ranking official, the Commissaire de Province, the Count de Beaufort," Mr. Lindsay writes. "Both of these officials live in Leopoldville.

New Peak in Modernistic Design



A view of the main room in the Chicago Vitreous Enamel Product Co.'s new experimental laboratories. Paneling on ceiling and walls is of porcelain enameled Celotex, in matching color variations. The modernistic interior design is well exemplified by tiered posts in the foreground.

"We are also informed that all the leading hotels in the principal cities in this territory, especially Leopoldville and Matadi, are using large-size Shelvadors, and the assertion is made that soon there will be no hotel in the entire Congo without adequate refrigeration equipment.

"In addition our distributor tells us that a fleet of river steamers which trade up and down the Congo river are equipped with Shelvadors. The S. S. Denise, Battela, and Jacqueline, which are the flagships of this passenger fleet, have become famous for the excellent quality and condition of the food and drinks they serve, all made possible by electric refrigeration."

Modernistic Laboratory

Last week this page was devoted largely to a description of our trip through the most modernistic laboratory we have even seen, that of the Chicago Vitreous Enamel Product Co.

Space didn't allow for all our comments on this highly interesting building, so these remarks have been permitted to overflow into this issue.

One of the best eye-catchers in the entire laboratory is a striking oil painting showing a worker "tapping-off" a smelt of porcelain enamel frit. This occupies a large space recessed in the wall of Mr. Sweely's office.

It was executed by HERBERT H. FIELD, JR., a prominent painter of industrial subjects, and has been done in a combination of realism and modernism to fit into the general design and color scheme of this room.

Mr. Field has effectively portrayed the rising steam as the white hot porcelain enamel frit is tapped from the smelter, coming into contact with the water below and being shattered into thousands of small fragments. The painting is enhanced by indirect lighting.

Many types of construction for porcelain enamel have been introduced during the last five or six years, notably at Chicago's A Century of Progress exposition. With the construction of its new laboratories, executives of the Chicago Vitreous Enamel Product Co. feel they have developed a method of modern construction and functional design which merits the serious attention of the architect and builder. For example, they point out that the following principles were followed in the construction of the laboratory:

1. A type of construction which makes it possible to take out any unit of the building—that is, any panel—without disturbing the surrounding panels, and with a reasonably simple and rapid operation.

2. Porcelain enamel surfaces remain flat.

3. A type of construction which allows for the expansion and contraction of the porcelain enameled panels.

4. Sweating on the back of the panel has been eliminated.

5. All panels provide for heat, cold, and sound insulation.

Fundamentally, they will tell you, this type of construction is simple. In addition to the porcelain enameled panel and stainless steel trim, it consists of only five elements:

1. General type of wall studding (2x4's). Steel studding may be used; however, wood was employed in constructing the laboratory.

2. Furring strips are placed over studding, and may be arranged for stainless steel strips to run horizontally, vertically, or both.

3. A U-bar is used where there is a flange joint. The flange of the porcelain enameled panel fits into the U and is caulked with a plastic compound.

4. A T-bar is used where there is a panel strip, with the edge of the panels resting on the face of the T-bar and covered with a stainless steel covering strip, which is caulked underneath.

5. An angle bar is used for ceiling, coping, or base. In this instance a special patented and pre-fabricated piece is used in which a stainless steel cover strip is fastened to the angle bar and filled with caulking. The panels are then slipped behind the folded edge of the stainless steel strip and angle bar, and the spring tension of the stainless steel holds it in place.

In this type of construction the porcelain enameled panels are veneered to 3/4-in. Celotex. This reduces warpage, eliminates sweating, and insulates panels against transmission of heat, cold, and sound.

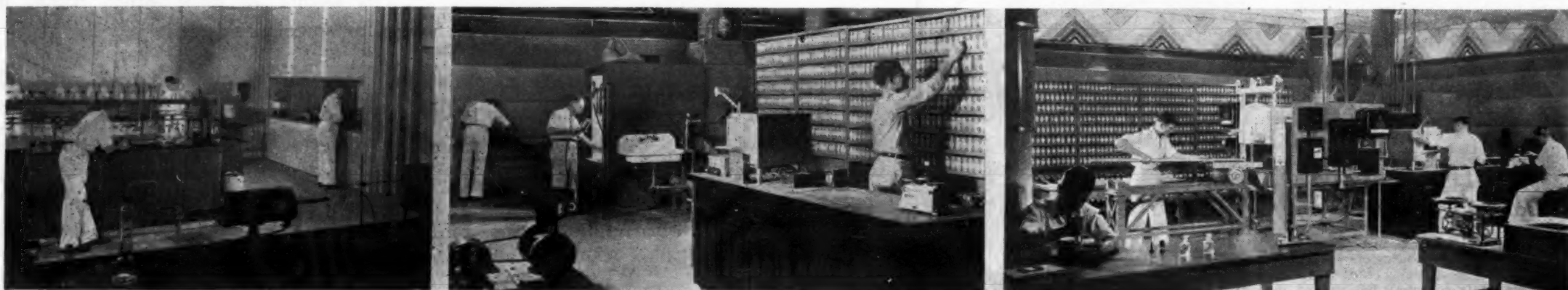
These panels, after being insulated, fit into the framework of furring so the metal panels rest on wood, and at the same time permit the Celotex to fit into a wood frame. This effects a double framing and makes the installation weatherproof.

A U-shaped track containing a caulking compound is placed over the raw edges of the panels. This is screwed to the wall and effectively seals the panel's edges, permitting expansion and contraction and effectively sealing the building.

To improve the appearance, a snap-on cover strip of stainless steel is put over the track, covering the screws. Flange joints are set into a key-shaped slot, then caulked with an especially prepared cement which stays plastic.

Consultant on architecture of the laboratory was R. HAROLD ZOOK; on air conditioning, LEONARD J. KRANE; and on color, LOUIS H. WEINZELBAUM.

Scientists at Work in New Laboratory of Chicago Vitreous Porcelain Enamel Co.



(1) All raw materials used by the Chicago Vitreous Enamel Product Co. in the manufacture of enamels are analyzed, before use, in this analytical chemical laboratory. Walls and ceiling of this room are finished in a "satin matt" acid-resisting porcelain enamel. (2) A section of the main laboratory, devoted to color matching and the development of new color shades and finishes. Hundreds of color oxides are kept in the cabinets at right. (3) One of three miniature porcelain enameling plants, in the main laboratory room. Here, ceramic engineers perform a series of tests on every smelt of enamel frit produced in the production smelters.



A MESSAGE TO MEN WHO BELIEVE IN THE

future

Air conditioning is the *sine quo non* of genuine home and building modernization.

And some air-conditioning manufacturers—those with vision, with foresight, and with the courage of their convictions—will make the most of the much-talked-of building boom.

Many are expecting it. "From brick makers to lace curtain manufacturers, business men the country over are watching sharp for the bandwagon, determined to get a good seat. For, say they, it's about to begin—the building boom of the late '30's" (Tide, October).

But more than just "watching sharp" is needed. Sound planning ahead is necessary to assure results in terms of gratifying sales. You can plan your sales program now, through refrigeration distributors and dealers, both commercial and household—the A-1 salesmen of American business, because they talk to the prospect in his own language. Not just knowledge of similar mechanical problems, but knowledge of the market makes this group successful where others have failed.

Whatever the contact of your product with air conditioning, you can reach the men who will count most through Electric Refrigeration News. To prepare for your share of the building boom, establish your sales contacts with advertising in the News—*now* the business newspaper of both the refrigeration and air-conditioning industries.

**ELECTRIC
REFRIGERATION NEWS**

5229 Cass Ave., Detroit, Mich.



Five-Point Credit & Collection Plan Cuts Bad Debt Losses

DENVER—A. H. Wright, credit manager, B. K. Sweeney Electrical Co. here, has developed a five-point credit and collection policy for electric refrigerators with which he claims to have cut credit losses.

1. *The 60-day dead line.* All applications are carefully investigated. Extraordinarily favorable conditions attending refrigerator sales are reflected in the fact that, judging applications conservatively, Mr. Wright rejects approximately 1%, while of the washing machine applications, approximately 33% are rejected.

If payment is not met within two days of due date, the office sends a delinquency notice, so constructed that it may be used as a remittance form. Five days later, there is mail follow-up, and, unless there are special circumstances, the follow-up continues at five day intervals until the 60-day dead line is reached. Then, a personal representative of the company visits the debtor.

The choice is put squarely up to the customer, of repossession, or a favorable arrangement.

2. *Monthly payments only are extended.* The type of credit customer the company insists on for refrigerator sales can safely be handled on a monthly basis, the office economy of which is obvious.

3. *Ordinarily, the credit man does not see customer until after sale.* Whether the refrigerator is sold on the sales floor, or outside, Credit Man Wright seldom meets the buyer until payments begin. Salesmen are trained to take applications, which are carefully investigated and passed on by Wright. Customers are not subjected to the inconvenience and possible em-

barrassment of a visit to the credit department.

However, once the customer begins to pay on account (and about 90 per cent of payments are personally brought to the office), Wright makes it his business to get acquainted with the customer at once. Customers pay more promptly when they know the credit man. The latter, with a quite intimate knowledge of each customer, is better able to administer collections. There is a second important objective—"add-on" sales. The credit man seizes opportunities to suggest additional purchases. The effort is directed towards keeping the family on company books permanently.

4. *The credit manager does not request customers to call at the office.* In one typical case, the local bureau had no data on the applicant, who was a newcomer. The salesman spoke of things which indicated the family was in a position to meet the terms of a contract. Wright visited the home, conversed with the buyer, learned facts of income from out-of-town that established the business as desirable.

The "request to call," under these conditions, might easily have lost the sale. The request probably would have been unheeded. By the time the Sweeney representative had got around to follow up, the prospect quite likely would have bought a refrigerator somewhere else.

5. *Pleasantness is insisted on in all collection conversations.* The right salesmanship for the credit department requires that, in all collection situations, the attitude toward the customer be a pleasant one. Firmness and pleasantness can be practiced at the same time.

FHA Will Present Plan For Ensemble Selling By Dept. Stores

CHICAGO—Inclusion in department store personnel of a supervisor to direct sales made under FHA loan terms, and to increase "ensemble" sales through use of this finance system, is the merchandising plan which will be presented by FHA officials at the International Housewares Show to be held in the Merchandise Mart, here, Jan. 6 to 18.

Featured at the show will be an FHA department exhibiting all the appliances and houseware items eligible for FHA financing. This model set up, which can be duplicated in any department store, will cover 2,100 sq. ft. of space on the thirteenth floor of the Mart. It is being arranged under the direction of Henry A. Guthrie, chief of the exhibits section of the FHA.

Two hundred and eighty manufacturers of housewares, representing more than 400 lines, will exhibit products at the show. Manufacturers representatives and members of the housing administration will be present to explain how buyers may purchase appliances on FHA terms.

Buyers and merchants will get an idea of the exact set-up possible under the FHA provisions. They will see what appliances can be sold, the government's function in underwriting appliance sales, and how merchants may secure loans for remodeling purposes.

Burns Commercial Dept. Sales Total \$7,500 On One Day

PHILADELPHIA—The commercial division of the Judson C. Burns organization, General Electric distributor, turned in a total of \$7,500 in sales on "Red Letter Day," held Nov. 1 in honor of P. B. Zimmerman, head of G-E's specialty appliance sales department, to set a new high record for the department.

Supervisor Al Toohy led the day with \$3,600 in sales; Dave Young was second, with \$3,085; and Jess Popky third, with \$900. Among the salesmen, John Cook led the way with \$2,200, while a newcomer in the organization, A. Leaderman, totaled \$775 to place second.

G-E Range Sales Increase 2½ Times in October

CLEVELAND—Sales of General Electric ranges for the month of October were two and one-half times the sales for the same month of last year, reports J. R. Poteat, manager of the range division of the company's specialty appliance department.

October sales also were 35 per cent ahead of sales for September, 1935.

Mueller Brass Puts Stock On Regular Dividends

PORT HURON, Mich.—Mueller Brass Co. has placed its stock on a regular dividend basis by declaration of an initial quarterly dividend of 20 cents per share, payable Dec. 2 to stock of record Nov. 20. The stock was listed on the Detroit Stock Exchange recently.

Gross sales for October were larger than for any month since June, 1929, reports Fred L. Riffin, vice president.

Cleveland Exposition Next Year Will Put Spotlight on Housing

CLEVELAND—Modern housing and the things which go to make the modern home more comfortable will be featured, according to present plans, at the Great Lakes Exposition to be held in Cleveland during July, August, and September of next year in celebration of the city's centennial anniversary.

The unusual progress which has been made in the last few years in air conditioning, plumbing, heating, and refrigeration will be illustrated, and home builders will have an opportunity to see what advancements in efficiency and comfort a new home can have.

The exposition, which has been heralded as the largest civic event in the history of Cleveland, will be staged on 80 acres of downtown Cleveland lakefront. The huge public hall and underground exposition hall and the municipal stadium will also be used.

G-E Relief Plan to Be Closed When Federal Law Is Effective

SCHENECTADY—General Electric's unemployment compensation plan, into which employees and company have contributed more than \$7,000,000 in the past five and one-half years to care for its workers during years of depression, will terminate on Dec. 31 when the federal social security act becomes effective, President Gerard Swope stated last week.

"In compliance with the social security act of the federal government, the General Electric Co. must pay a tax on its entire payroll beginning with one per cent on Jan. 1 and increasing to three per cent in 1938," Mr. Swope explained.

"The federal law puts no tax on the employees, but it is permissive for the states to do so. In some states laws have already been passed calling for contributions by employees. It seems clear, therefore, that the General Electric plan must be terminated, as neither the company nor the employees will desire to pay under the federal and state plan and also under the company plan."

There is approximately \$3,000,000 on hand, \$1,750,000 of which is in the local works funds and \$1,250,000 in the general fund. In accordance with the rules of the company's plan, the balance in the general fund cannot be returned to those who contributed, but the \$1,750,000 in the local works funds, of which the company contributed one-half in matching every employee's contribution dollar for dollar, can be liquidated and the employees will vote on the disposition of this money in the various works next week.

They will have the choice of three ways of doing so; first, by liquidating the entire amount which will result in 45,000 employees receiving about \$20 each; second, terminate payments into the fund on December 31, 1935, but continue benefits from the fund as long as the money lasts or until Dec. 31, 1937, when benefits under the state laws become effective (the balance, if any at that time, may be added to a proposed relief and loan fund); third, terminate payments on Dec. 31, 1935, but allow the amount in the fund to remain and to be used as part of the proposed relief and loan plan.

REA Official Declares Electrification Program Should Be Long-Range

WASHINGTON, D. C.—Federal participation in a comprehensive rural electrification program of long range rather than of a temporary work-relief character is economically and socially justifiable, Rural Electrification Administrator Morris L. Cooke declared last week in a letter to Senator George W. Norris of Nebraska.

The letter to Senator Norris was in reply to a request which the Senator made for information regarding a nationwide rural electrification plan.

Administrator Cooke pointed out that "because the Federal Government is the only agency which can negotiate with all the parties who are involved and who will share in the benefits of such a program, and because it shares the obligation to give our farm people their due, a just system of financial aid is warranted."

In 10 years Administrator Cooke estimates, 50 per cent of all rural homes could be electrified.

The present situation is that 10.9 per cent of American farms are receiving central electric station current.

Such a program, the Administrator declared, would require an outlay of about \$1,500,000,000 from public and private sources, at least one-third of which should be self-supporting.

"The criterion of the extent of Federal aid, if any," the Administrator continued, "is the cost per customer, assuming a potential customer use that satisfies minimum requirements of feasibility."

He pointed out that the cost per customer, with the same line construction specifications, is considerably lower in more densely settled districts than in sparsely populated regions.

While certain regions can never be economically electrified, the Administrator declared, "any area where costs would not be prohibitive and the prospective use of electricity would be sufficiently large, should have power."

In conclusion, Administrator Cooke said, "Electric power has become one of the basic essentials in our capacity to live, to produce, and to consume. It is a social necessity."

Senator Norris wrote to Administrator Cooke on October 24 asking information as to "what would be involved in the proper extension of rural lines, so that a much larger percentage of rural homes may be electrified, and how soon this can be brought about." He also asked the Administrator's "judgment as to the propriety, the wisdom, and the justice of providing a subsidy in order to carry out this program and at what point this subsidy should begin."

The Senator's letter opened with the statement that it is "increasingly obvious that the time is at hand when, as a Nation, we should adopt a more positive program for electrifying the largest possible number of our farms."

He pointed out that because the private power companies, in their rural extensions, "have naturally selected the most densely settled sections *** many rural communities are omitted entirely, and the comparatively small number *** thus electrified leaves out large numbers of communities which should be supplied with electricity."

Brooklyn Utility Instructs Dealers on Ranges

BROOKLYN—Five sales-instruction classes free to dealers and their salesmen are being conducted by the Brooklyn Edison Co., in its drive to increase electric range sales.

Classes are being held in the auditorium of the Electrical Association of New York, on the following subjects: fundamentals of electric cookery, comparison of electricity with other fuels, range construction, oven cookery including broiling and temperature controls, suggestions on use of this material in presentation of the electric range sales story, and selling, coordination, and closing the sale.

Keeping Pace

OUR engineering staff is continually alert to improve the line of ACE HARD RUBBER DOORS, RAILS, JAMBS and other parts for Display Refrigeration Equipment. Manufacturers look to us for standard products and dependable service. They get it.

A complete catalogue will be mailed to manufacturer who wishes to consider Ace products and Ace service.

AMERICAN HARD RUBBER CO.
11 MERCER STREET, NEW YORK, N. Y.
Akron, O. • 111 W. Washington St., Chicago

At last—"maintenance-free" Motor Control!



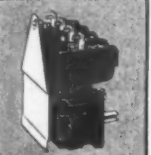
Double-Break Contacts



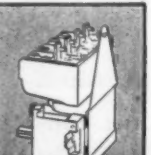
Solenoid Mechanism



Ample Wiring Space



No Slate Panel



No Back-Panel Wiring

THREE SIZES



No more contact dressing with ALLEN-BRADLEY CONTROL EQUIPMENT...

● Allen-Bradley has designed a new line of motor control equipment having patented double-break silver-alloy contacts which eliminate all contact maintenance. Pitting and burning of these contacts does not form insulating oxides, consequently, filing and dressing of contacts are no longer necessary.

Poor voltage regulation does not affect the reliability of Allen-Bradley Bulletin 709 solenoid starters, as they do not open the motor circuit until the line voltage has dropped to 50% of normal. Furthermore, the low pickup voltage of the Bulletin 709 assures positive closure and proper seating of the magnet under low voltage conditions.

Bulletin 709 Single-Phase Automatic Starter....

A solenoid-type across-the-line starter for single-phase motors. Operated by push buttons, pressure switches, thermostats, or other pilot control devices. Its double-wound coil can be reconnected for either 110 or 220 volts. Has double-break silver-alloy contacts. Overload relay provides motor protection. Four types of enclosures. Sizes to 3 H.P., 110 volts; 5 H.P., 220 volts.

Bulletin 709 Polyphase Automatic Starter....

A compact solenoid-type starter for two and three-phase across-the-line motors. Provides remote control and no-voltage protection. Has double-break silver-alloy contacts. Drop-out and pick-up voltages are exceptionally low. Can be mounted directly to metal surfaces without additional insulation. Available in seven types of enclosing cabinets. Sizes to 15 H.P., 110 volts; 30 H.P., 220 volts; 50 H.P., 440-550 volts.



Write for Bulletin 709 and 709SP

Allen-Bradley Co.

1313 S. First St. - Milwaukee, Wis.



ALLEN-BRADLEY
SOLENOID-TYPE MOTOR STARTERS



For recharging methyl systems, use only ARTIC—du Pont's special refrigeration grade of Methyl Chloride. Produced under strict chemical control and PRE-TESTED before shipping. Low moisture and acidity, high purity are guaranteed.

Authorized ARTIC distributors at strategic points carry adequate stocks of ARTIC in standard containers. Prompt shipment can be made to all parts of the country.

Service Men: Send for our Free book, "ARTIC Service Manual"—32 pages of useful information on handling, servicing, leak detection and testing, etc. Let us put you on our mailing list to get "ARTIC Service News"—the timely news bulletin for refrigeration men.

THE R. & H. CHEMICALS DEPT.

E. I. DU PONT DE NEMOURS & CO., INC., Wilmington, Del.
District Sales Offices: Baltimore, Boston, Charlotte, Chicago, Cleveland, Kansas City, Newark, New York, Philadelphia, Pittsburgh, San Francisco

AIR CONDITIONING

Better Business Bureau Defines Terminology For Advertising of Air Conditioning

(Concluded from Page 1, Column 5)
the recently approved Standards for Rating and Testing Air Conditioners (published in the Nov. 20 and this issue of ELECTRIC REFRIGERATION NEWS), and recommends them to prospective purchasers of air-conditioning equipment.

Text of "A Guide to the Proper Use of the Term 'Air Conditioning' in Advertising" is as follows:

"Literally, anything which affects the atmosphere within a structure, such as an electric fan, the opening or closing of a window, a heated radiator, a pail of water, smoking, flowers, and innumerable other factors 'condition' the air to a certain extent.

"If there were no industry offering something which it sold to the public as 'air conditioning,' there might be no objection to describing any of these acts or articles as 'air conditioning.'

Definition of Air Conditioning

"But since something called 'air conditioning' is being advertised and sold to the public, it is in the interest of both fair competition and the public that there be a mutual understanding of what this term means. For this reason the National Better Business Bureau has made a careful inquiry into the subject with a view toward defining air conditioning for the guidance of all who are interested in maintaining public confidence in advertising.

"We find agreement among the manufacturing industry, architects and heating and ventilating engineers that 'air conditioning,' generally speaking, is the scientific preparation and simultaneous control of the atmosphere within a structure. The atmosphere is affected by such factors as temperature, humidity, motion, distribution, dust, bacteria, toxic gases, and ionization.

Factors Affecting Comfort

"The three factors which probably affect human comfort to the greatest degree are temperature, humidity, and motion of the air. It is simultaneous control of these three factors which scientific authorities agree constitutes the minimum requirements for air conditioning.

"Because the functions performed for air conditioning in the summer differ from those required in winter and because units are offered to the public which produce air conditioning in the summer, but not in the winter and vice versa, the following classifications and minimum requirements of air conditioners have been adopted by the trade, scientific authorities, and the National Better Business Bureau.

Functions of Systems

"Summer Air Conditioning should perform, as a minimum, the following functions:

- (1) cool the air,
- (2) dehumidify the air,
- (3) circulate the air.

"Winter Air Conditioning should perform, as a minimum, the following functions:

- (1) heat the air,
- (2) humidify the air,
- (3) circulate the air.

"Year-Round Air Conditioning should perform, as a minimum, the following functions:

- (1) cool and dehumidify the air in summer,
- (2) heat and humidify the air in winter,
- (3) circulate the air.

"It is understood that the functions required by the season of the year are performed automatically and simultaneously to meet the specific minimum requirements of the user.

Ask Cooperation of Advertisers

"The Bureau requests the cooperation of all interested in fair advertising in eliminating the use of the term 'air conditioning' or 'air conditioner' or 'air conditioned' to describe such articles as fans, humidifiers, odor absorbers, underwear, hats, etc. Loose terminology of this nature may not necessarily deceive the public, but it paves the way for a manufacturer who may wish to 'cut corners' to offer to the public air conditioning equipment which does not perform the minimum functions of air conditioning as generally understood by the trade, justifying his deception by claiming that the term 'air conditioning' has no exact scientific meaning.

"Recently the Federal Trade Commission considered a case in which the manufacturer of a radiator evaporator claimed to be selling an 'air conditioner.' After due investigation into the proper use of this term, the Commission issued the following release:

Trade Commission Case

"Unfair advertising through use of the words 'air conditioner' to describe a device which is not an air conditioner, as those words are generally understood in the trade, will be discontinued by George Landon and Michael Mason Warner of Chicago, trading as Landon and Warner, under a stipulation entered into with the Federal Trade Commission.

"Landon and Warner agree that in selling a humidifier they will not use in their advertising matter the words 'air conditioner.' The stipulation points out that the respondents' apparatus performs only one of the functions of an air conditioner, namely, that of supplying humidity."

"The Bureau recommends that publishers, advertising agencies and advertisers apply the definitions given herein in the censorship and preparation of advertising copy.

Standards Developed

"NOTE: Attention is also called to the fact that Standards for Rating and Testing Air Conditioning Equipment have been formulated by a Joint Committee composed of engineering representatives of the American Society of Refrigerating Engineers, the American Society of Heating and Ventilating Engineers, the Air Conditioning Manufacturers' Association, the Refrigerating Machinery Association, and the Refrigeration Division of the National Electrical Manufacturers Association.

"These standards embody the best thought of leading air-conditioning technicians and enable a purchaser of air-conditioning equipment to buy with a greater degree of certainty of securing an air-conditioning installation which will furnish the air conditions he desires."—National Better Business Bureau, Inc.

Jewels Brighter in Conditioned Store

NEW YORK CITY—Because lusterless gems led to customer-less days, the management of Trifari, Krussman & Fishel, Inc. here, purchased three air-conditioning units to cool the air in its jewelry shop, and thereby increased sales this summer 23 per cent over sales made during the summer of 1934.

When the jewels were shown to a customer in the summer the heat dimmed their brilliance, and lessened their customer-appeal, the officials declared. To banish this sales foe, the air-conditioning units were installed.

Equipment consists of three floor-type units, one placed in the front of the store, one in the center display room, and a third in the private office in the back of the shop. Two units have heating surface; the third is strictly a cooling unit with suitable drainage connections.

Two of the units have 2-ton cooling capacity, the third is a 1-ton unit. Approximately 12 per cent cooling effect is produced throughout the shop, with air changes occurring two to three times per hour, and with a relative humidity which seldom exceeds 45 per cent.

Customers now shop in comfort both winter and summer, and buy jewels whose sale is no longer hindered by having their gleam and glint dimmed by adverse temperature and humidity.

Kroeschell Engineering Co. Moves to New Location

CHICAGO—Kroeschell Engineering Co., air-conditioning dealer and engineering firm of this city, recently moved to larger quarters at 215-217 Ontario St.

Westinghouse Equips WNAC Studios And Offices

BOSTON—First New England radio station to be completely air conditioned is WNAC, headquarters of the Shepard Broadcasting System, here, D. M. Ramsay, supervisor of the Westinghouse Boston office reports. Buckley & Scott Utilities, Inc., Westinghouse dealer, made the installation.

Equipment installed includes a combination central plant and unit system. Condensing equipment consists of one RW-536 and one RW-211 units, with five type ES-43 evaporators and humidifier assemblies operating with a common condenser and oil equalizer.

Five EL-12 floor type units are installed in the executive offices, in addition to the central plant system for the main studios, control rooms, and the transcription rooms.

Oil Burner Show Opens April 14 in Detroit

NEW YORK CITY—Twelfth National Oil Burner Show will be held at convention hall, Detroit, April 14 to 18 inclusive, reports Harvey Porter, managing director of Oil Burner Institute.

Coffee Shop in El Centro Installs York System

EL CENTRO, Calif.—The United Artists Coffee Shop here was recently air conditioned by Electrical Refrigeration Service, local York distributor. Equipment consists of a York model C-600 air conditioner and a model 428FW Freon condensing unit.

Air Conditioning Cost Estimated at \$1.75 Per Foot of Space

NEW YORK CITY—The cost of installing and operating an air-conditioning system is slight, in relation to increased store profit, declares Andre Merle, New York consulting engineer.

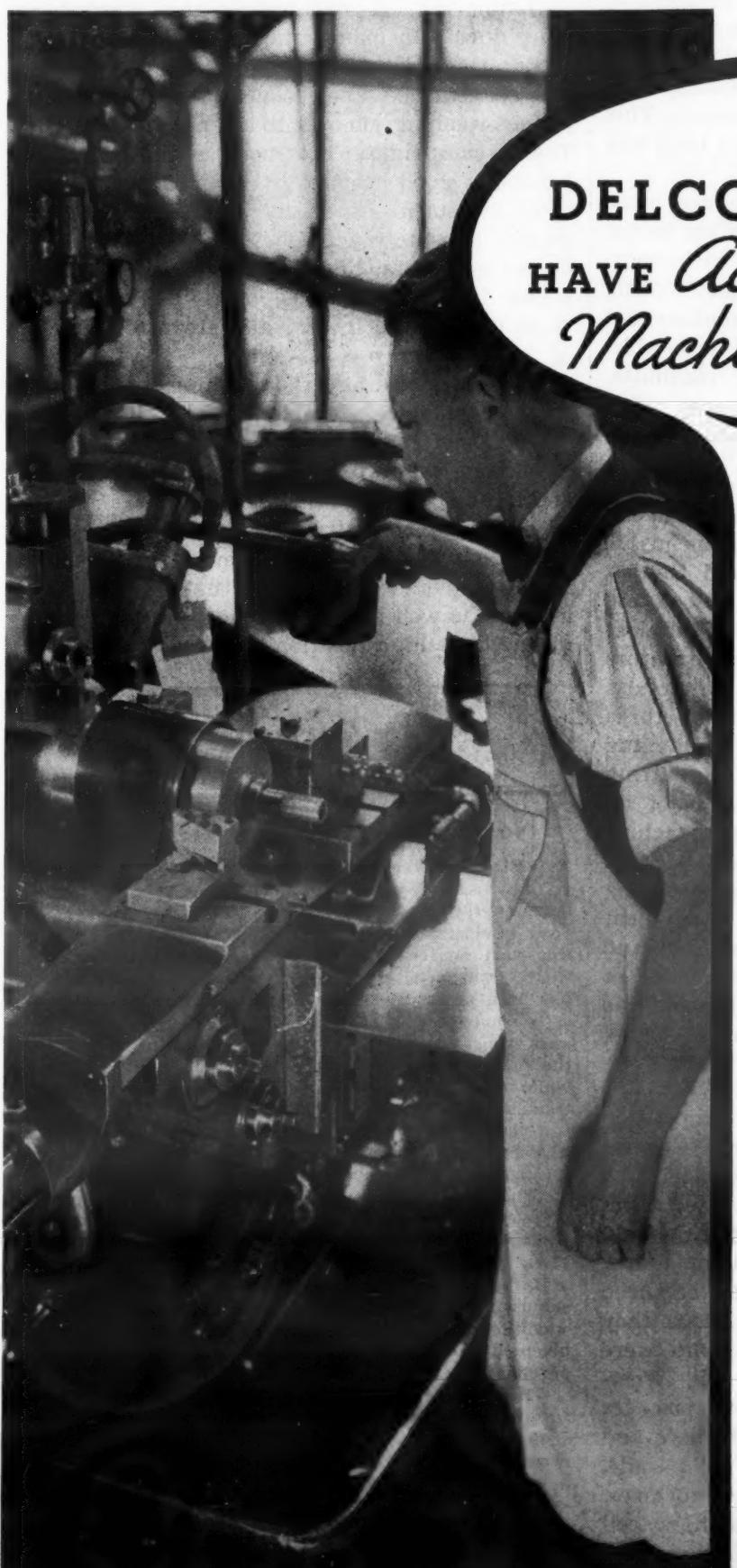
"Store systems have paid for themselves in three years, through increased patronage," Mr. Merle says. "They mean clean business and less spoilage, making bargain-hunting a pleasure."

Unit conditioning systems may be installed for \$1.75 per sq. ft. of active store area, the writer contends. This, of course, does not include extras such as electrical power, condenser water, piping, or other plumbing. Units may be connected to duct work, similar to central station equipment.

"It is more economical to connect one of four units with outside air, using the others as recirculators," says Mr. Merle. "There may be floor, wall, or ceiling-suspended units without duct connections, with artistic enclosures."

"In a 20x50-ft. store, for average occupancy and illumination, two 1,000 cu. ft. unit conditioners and one 5-ton Freon refrigerating compressor should be operated for 28 cents an hour in electric and water cost, figuring 20 cents for electricity to run a 6-hp. motor, compressor, and fan, and the 8 cents for 5 tons of condenser water."

"Estimating 120 days of summer, with operation six hours a day, at 60 per cent load capacity, this cost would total \$120.96. Minor repairs, replacement of air filters, machine oil, and Freon gas should average about 9 per cent of the initial cost per season," Mr. Merle concludes.



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DELCO MOTORS

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REFRIGERATOR PARTS DEPT.
Miller Rubber Products Co., Inc.—Akron, Ohio

ELECTRIC REFRIGERATION NEWS

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Specialty Distributors Stimulate the Home Laundry Business

WASHING MACHINES are in the electrical appliance spotlight just now, and deservedly. Following the footsteps of the household electric refrigeration industry, manufacturers of washing machines last year set a new all-time high sales record, a mark which they passed in the first 10 months of 1935. Total sales reported last year were 1,121,137 washing machines. This year it is being predicted that the sales total will pass 1,300,000.

It has been estimated that there are more than 10 million electric washing machines in use in the United States today, along with some 200,000 electric ironers (last year 116,000 ironing machines were sold). Already the replacement market has become fruitful and profitable. Business in second-hand washing machines, repainted and repaired by the dealer who takes them on trade-ins, has been brisk, too.

Specialty Distributors Responsible

While joining the washing machine industry in its general rejoicing over the commendable sales figures established last year and this, it might be well to call attention to one of the main reasons for this happy state of affairs: the entrance of electric refrigeration distributors into the washing machine merchandising picture.

When General Electric decided, some three years ago, to do something about its lagging washing machine and ironer sales by putting home laundry equipment into the hands of its refrigeration distributors, the washing machine business was in something of a mess. Sears Roebuck retail stores had forced washing machine prices 'way down to a point which most competing dealers felt they could not meet and make a fair profit. Hence large numbers of them quit trying, and Sears Roebuck soon was obtaining a lion's share of the business.

Price Competition Tough

Bucking up against this price competition was not an easy task, and at first General Electric refrigeration distributors were inclined to think that the home office had handed them a lemon when it was decreed that they should handle washing machines. But patient effort, directed by P. B. Zimmerman with his "balanced job" quota system, brought results. Soon they were joined by Norge distributors, who were given the Norge Autobilt washer to sell. Westinghouse dealers were encouraged to promote washing machines heavily. And then, here and there, strong dealers began to join the parade, and acquired home laundry equipment franchises.

The effect of the entrance of these nonpareil merchandising organizations into the washing machine business began to be felt early in 1934, and has continued ever stronger right through 1935 up to date. As a result, the sale of washing machines has reached record new highs each year. It should also be noted that electric ironing

machines never did get started until refrigeration distributors got hold of them and began to promote them as a useful specialty appliance.

If in 1936 washing machine manufacturers are able to lure more distributors and dealers of the type that put across electric refrigeration, they should feel assured that their industry sales figures should continue to climb.

Economy Argument Well Substantiated

Once they get onto it, specialty salesmen find that the home laundry sales story holds together remarkably well. The concrete evidence of the prospect's own laundry bills can be used by a good salesman with telling effect. Balanced against a schedule of payments on a washing machine, these laundry bills can be made to impress prospects with a very definite idea of the amount of money they can save by purchasing a washing machine. Moreover, when they have completed the schedule of payments, they own a washing machine, at which time—instead of just saving the difference—they save practically all the laundry bill.

Nor is that the whole story. The wear and tear on clothing which goes to a laundry every week is more costly than most families realize. Testimonials of users can be utilized to show prospects how much money they can save on clothing replacements by doing their washing with home laundry equipment, which is under their own control, and which is designed and constructed with the idea of careful work—rather than speed—predominant.

Commercial Laundries Fight Back

Laundries are not taking this competition lying down. In many cities they are sponsoring cooperative advertising campaigns which stress the convenience and economy of turning the clothes-washing job over to commercial laundries. These campaigns, however, actually can be turned to good account by home laundry equipment salesmen—especially when they are contacting prospects who do their own washing at home by old-fashioned elbow-grease methods. Relief from drudgery is, of course, the theme to be emphasized in the sales story to this class of prospects.

Several years ago the washing machine was the pet appliance of public utilities, jobbers, and dealers, just as the electric refrigerator is today. Saturation went up, other appliances came along, and interest waned. But today, with some of the world's finest specialty distributing organizations giving home laundry equipment their serious attention, it would seem that the washing machine is well along the road toward regaining its previous high position.

WHAT OTHERS SAY

No Arguments Against Achievement

EVERYONE connected with the electrical industry has reason to feel proud of the progress of that industry through recent years. The achievement is the more remarkable, because it has become possible to supply this vast source of power at a steadily declining cost to the consumer, even when the general trend of prices has been upward. Moreover, when government threatens as a competitor in this and other industries, there is an answering argument to public ownership advocates in the fact that the cost of electricity has declined steadily, while the cost of government has been mounting at a tremendous and unprecedented rate.

There is the almost mathematical certainty, too, that this process of providing cheaper power can continue through many years if government interference doesn't end the incentive for achievement and hamper the progress of science unduly. That gain for the populace will come through increased demand and use for new devices. There is a place for electricity on hundreds of thousands of farms that lack that convenience now. Many city and suburban homes will have added use for it as air conditioning gains in popularity, and new appliances are invented and placed within reach of the rank and file of purchasers.

However, even the achievements of a record that is sure to improve, if given fair opportunity, are formidable arguments against a policy that would entrust an enterprise so vast to those governmental agencies that make a virtue of extravagance, and regard mounting cost as a system of sharing the wealth. There is no real substitute for efficiency, study, resourcefulness, and the will to progress. There is proof enough of the need of incentive in the record of many industries, and in mankind's whole history of conquering the wilderness and winning a world to civilization. In none is this evidence more conclusive than in the electrical industry, which has continued to extend its service to increasing numbers at lower cost and in broader scope, at the time it has lowered prices in a world of rising costs.—The Oklahoma Meter.

LETTERS

Taxes on Rebuilt Units

Federal Refrigerator Corp.

57 East 25th St., New York City

Editor:

We wish to take this opportunity to thank you for your prompt attention in mailing us the various copies of ELECTRIC REFRIGERATION NEWS in which you referred to the "Excise Tax on Reconditioned Refrigerators."

According to the opinion of the local Internal Revenue Administrator, the identity of any used refrigerator is changed by replacing any defective parts of a compressor, motor, expansion valve, etc., thereby making such rebuilt refrigerators taxable.

The used refrigerator business will shortly become a real factor in the refrigeration industry. We believe the various companies that are reconditioning refrigerators should give considerable thought to this 5 per cent Excise Tax.

Not only is the government interested in taxing future reconditioned refrigerators, but is also interested in collecting a tax on all rebuilt refrigerators sold since the Excise Tax has been in effect.

For the time being, we have referred the local Federal Bureau to the article in your issue of Aug. 11. In the meantime, we would like to obtain the opinion of your legal department on this matter, or the opinion of any of the readers of ELECTRIC REFRIGERATION NEWS.

JOHN M. BESS,

Vice President & Treasurer.

Names of Independent Service Men Wanted

The Halsey W. Taylor Co.

Warren, Ohio

Publisher:

In the 1935 edition of REFRIGERATION DIRECTORY, on pages 361 to 375, you show a list of independent service companies. This list is satisfactory as far as it goes. However, in many states, we find many of the largest cities without a service company listed.

It is our desire at this time to secure a list which will be more complete. Will you please advise us if such a list is available and how it may be procured.

J. F. KING,

Sales Manager.

Wants to Contact Canadian Dealers

The Starr Co.

Richmond, Ind.

Publisher:

We would like to procure a list of refrigerator dealers and jobbers and refrigerator service organizations in Canada and wonder if you have such a list available or could tell us the best place where one might be procured. We would appreciate any assistance you could give us along this line.

H. J. WIGGANS.

New Catalog Mailing Service Explained

Answer to two letters above: We have received a number of similar requests recently and have been working on a plan to meet this demand.

Nearly every day we get a letter from some concern stating their intention to enter the refrigeration supply or service business and requesting information regarding manufacturers of suitable lines of parts. (See example below.) We have also received numerous letters from manufacturers wanting the names of jobbers, service men, dealers, etc.

This activity has been accelerated considerably since the recent meeting of manufacturers and jobbers in our office and it appears desirable that some system should be worked out to take care of the situation. We believe that the best idea is to provide a catalog mailing service which will serve the needs of both manufacturers and jobbers.

We have been working on plans for a service of the kind for some time and the refrigeration supply jobber situation seems to offer an excellent opportunity to try out the idea. If the plan works out well, we will later extend it to include service men, dealers, and other classifications.

According to the plan, the manufacturer subscribing to this service will send us his literature in bulk and we will mail copies directly to the names now on our list and to others as fast as they come in. We will put the literature of all the manufacturers who accept the proposition in one envelope and will make a general mailing at least once a month.

If the catalogs, leaflets, price lists, and other material furnished by the manufacturers are of uniform size (8½x11), we will arrange it in a suitable folder with a printed list of the material on the face of the folder. This will provide the jobber, service

man, etc., with a ready made filing system in case he does not already have one of his own developed. We believe that they will greatly appreciate the material and will take advantage of this opportunity to maintain a complete and orderly file of manufacturers' literature.

Obviously, the plan will result in a considerable saving in postage and in the work of maintaining a mailing list. We believe that we can handle the job efficiently and at the same time quote a price which will be less than the cost which a single company would incur in handling the mailings and maintaining the lists. The principal advantage, however, is that the list will be constantly kept up to date and new jobbers coming into the business will receive catalog material immediately.

Another feature of the service will simplify matters for the recipient. We will enclose a return blank with each folder which may be mailed directly to us and we will distribute inquiries for additional information.

It is a difficult job to classify and maintain lists properly and the real problem is that of training employees to handle the work efficiently and correctly. It is no trouble to lick this problem if there is a sufficient volume of the work and lists can be kept up to date (from post office returns), if mailings are made at frequent intervals.

We now have excellent equipment in our office for maintaining lists and, with our new building, we now have sufficient space available to develop a definite department to handle the job.

Additional information on the Catalog Mailing Service will be furnished on request.

Canadian Jobber

Modern Household Appliances, Ltd.

1106 Beaver Hall Hill

Montreal, Quebec, Canada

Publisher:

We are opening a refrigerator parts and supply department. For the past five years, we have been jobbing electrical refrigerators to retail outlets, new home builders, and property administrators.

During the past season, we have represented Rotary Seal and Cutler Hammer in the Province of Quebec.

We now wish to secure all other parts lines pertaining to refrigerators. How would you suggest making our contacts? Can we join any American Refrigerators Jobbers Association which would assist us in contacting manufacturers?

Representing refrigerator manufacturers in Canada represents quite a problem on account of the high import duties and the inability to return defective units. But we feel assured a reasonable volume could be obtained in a short time as there is not at present any complete supply company in Montreal.

The writer feels that a personal trip to one of the larger cities such as New York, Chicago, or Detroit might be the best way of establishing a connection. What is your opinion? What city or center has the most refrigerator parts manufacturers?

Possibly an advertisement in your most interesting review would help us to secure such connections. We enclose our advertisement form, which we would want you to publish in your columns for three issues. We will send you a cheque, as soon as your statement reaches us.

We are subscribers to your paper, and also have copies of your DIRECTORY and Introduction to your MASTER SERVICE MANUAL which we always find useful and look forward to the news of the refrigeration world.

Thanking you for any courtesy you see fit, to extend us in this regard.

H. M. MILNE.

Estimate Not Overstated

Tennessee Appliances, Inc.

407 Warner Bldg., Nashville, Tenn.

Editor:

You recently concluded a series of articles on John Patterson, and I was wondering if there was any plan in your mind to get this out in some booklet form for wider distribution. It seems to me it would be worth while.

I enjoyed your article on Ted Quinn as I happen to be one of those admirers whom you mention, and I can assure you that you in no way overstated your estimate about my feelings toward this great leader.

H. A. PENDERGRAPH.

Orchids for Quinn Story

R. L. Polk & Co.

Direct Mail Division, Detroit, Mich.

Editor:

I would like to toss an orchid at the man who wrote that story about Ted Quinn in one of your recent issues.

I have never read a better or truer evaluation of an outstanding business man. It had in it so much that is usually hidden or missed in the usual biographical sketch that I think you ought to set this writer at the job of limning other refrigeration men regularly.

F. J. MCGINNIS.

AIR CONDITIONING

Buffalo Bank Has System Employing Fedders Equipment

BUFFALO—Banking room, offices, and vaults of Buffalo Savings Bank, the city's largest, have recently been air conditioned, as part of the work of remodeling and enlarging of the structure, under the supervision of Edward B. Green & Son, architects, and Beman & Candee, consulting engineers.

The equipment used consists of two banks of Fedders air-conditioning coils, connected to two Worthington dioxide compressors.

Work Done by Carbondale

Contract for the work was executed by Carbondale Machine Corp., a unit of Worthington Pump & Machine Corp., and was under the direction of Lester T. Avery, Cleveland, air-conditioning engineer with Carbondale Corp.

The installation consists of two air-conditioning units, one, of 30,000 cu. ft., for the main banking rooms, and the other, of 4,500 cu. ft., for the safety deposit vaults in the basement.

The Fedders coils have 90 tons capacity, and are located in the recirculating chamber, on the top floor. They operate at 450 to 600 lbs. suction pressure.

Needle-type carbon dioxide valves, connected to coil manifolds, control refrigerant flow.

Cooling Load

Cooling and dehumidifying system removes surplus heat from the main banking room, which often has as many as 350 employees and customers in it, and 28,000 watts of lighting, as well as heat transmitted through large windows, with southern exposure fronting on a large paved plaza devoid of shade.

Control of the units is indicated by a differential thermostat operating signal lights, and set so inside temperature rises 1° above 72° F. for every 3° rise outside. Remote control of outside air, and recirculating air dampers provide for ventilation as well as air conditioning.

Relative humidity of between 50 and 55 per cent is maintained at all times and temperatures.

Johnson City, Tenn. Store To Get Comfort Cooling

JOHNSON CITY, Tenn.—A York air-conditioning system will be installed in the Thomas Department Store here by W. A. Owen, York distributor of this city. Equipment will include a York C-1000 air-conditioning unit and a 444FW, 5-hp. Freon condensing unit.

Air Conditioning Doubles Production Capacity Of Philadelphia Cocoa & Chocolate Firm

PHILADELPHIA—Installation of three air-conditioning units, one for each floor of the plant, has doubled the productive capacity of Blumenthal Bros., large cocoa, chocolate, and candy company here.

New ammonia compressors installed in the plant under the direction of J. H. Smith and W. G. R. Braemer, engineers, have a capacity of 192 tons of refrigeration. This amount, added to the plant's previous capacity of 95 tons, gives a 287 ton maximum capacity.

The equipment was engineered so that new and old refrigerating machinery may be used separately or simultaneously, in an economical hook-up.

The conditioned area covers a space 200 ft. by 80 ft., on each of the three floors. Since the building is 400 ft. long, partitions were erected to seal the conditioned area from the rest of the space.

These hollow tile partitions are insulated with about 6,000 sq. ft. of Armstrong Corkboard, applied in and finished with Portland cement plaster. The building's roof is insulated with 10,000 sq. ft. of corkboard, laid in asphalt over the old roof. Windows in the air-conditioned area are double-glazed.

Chocolate products are wrapped and packed on both the first and second floors, and the temperature here is kept at 65° F., with 50 per cent relative humidity. Part of the first floor is used for office space, and is conditioned for 76° F., with relative humidity of 40 per cent.

The third floor is used as storage space for raw materials used in candy making, and is held at temperatures from 52° to 60° F., with a 50 per cent relative humidity. Only about half of the total floor area is conditioned at present.

On each floor is a special Braemer dehumidifier, built under the direction of Smith & Braemer by William J. Strandwitz & Co., who also installed

Guarantee on Water Consumption Clinches Sale in New Orleans

NEW ORLEANS—"Water Consumption of this installation will not exceed 40 gallons per minute of 90 degree water," — this guarantee clinched the air-conditioning contract of the Standard Fruit & Steamship Co. building for Equitable Equipment Co. Westinghouse dealer here.

Standard Fruit & Steamship Co. leased an old bank building for the use of its engineering and traffic departments.

The company sought bids on a year-round air-conditioning system, with the stipulation that a cooling tower be included.

Equitable Co. engineers worked up a cost sheet showing the expense of the cooling tower and its operation, in comparison with the cost and amount of city water that would be used by mechanical condensing units. Investigation showed that it would take the company eight years to pay for the investment of the tower, if its original specifications were carried out.

When the Equitable Co. guaranteed the water consumption on the units, the contracting firm signed to employ the city water system.

Equipment consists of two RW-12 units, four ES-63 coils, one 2500 sq. ft. low pressure steam boiler with heating coils, automatic controls and filters.

Control system provides heating and humidifying for winter and cooling or dehumidifying in summer, at the touch of a switch.

Indianapolis Dealer Named by Lipman

INDIANAPOLIS—Sale of Lipman commercial and air-conditioning equipment in the central and southern Indiana territory has been placed in charge of Indianapolis Refrigeration & Air Conditioning Corp.

Manager of the new organization is A. H. Witt, who for several years served as branch manager of General Refrigeration Sales Co.'s Chicago branch office.

8 Portable Units Are Used in White House

WASHINGTON, D. C.—The 92 portable air-conditioning units sold in Washington this summer by the Washington Refrigeration Co., York distributor, included eight portable air conditioners for the White House, which were scattered throughout the building, cooling a dining room, two bedrooms, and an office.

Research with Rabbits Shows Benefits of Air Conditioning

BOSTON—Experiments with rabbits demonstrated that groups conditioned continuously in one particular temperature range outlived groups exposed to each of a number of temperature ranges in alternating periods, declared Prof. C. P. Yaglou of the Harvard Medical School in a recent address before the Massachusetts chapter of the American Society of Heating and Ventilating Engineers.

Prof. Yaglou's discussion seemed to point to the fact that the currently accepted comfort zones are not always coincident with "health zones."

Tests with rabbits, he said, showed that of several groups subjected to a preliminary temperature treatment, those least able to withstand unusually high temperatures of 96-100° F. were the group who had been alternately exposed to a temperature range of 88-90° F. and 52-60° F.

Conditioners in Utility Match Decorative Idea of Offices

BOSTON—Both atmospheric comfort and decorative harmony were achieved when the executive office suite of the Edison Electric Illuminating Co. here, was air conditioned with Westinghouse equipment.

The cabinets of the Standard EL-12 units installed were refinished in English oak to match the room paneling.

Condensing unit of this installation was mounted on the floor below the offices in a sound-proof room.

Buckley & Scott Utilities, Inc., installed the system.

New Air Conditioners Described in Catalog On Lewis Products

MINNEAPOLIS—Lewis Air Conditioners, Inc., has just issued a new catalog, describing, in addition to the H-1 and M-3 series which the company has had on the market for several years, the new H-2 and GC series, introduced this year.

The H-2 unit, a cabinet-type conditioner, is designed for the low price home field. It is identical in principle with the H-1 unit, performing the functions of humidification, heating, air circulation, and filtration, when connected with the heating plant, but is of smaller capacity, being intended for homes having up to nine rooms.

By use of mechanical refrigeration or low temperature water, the unit is convertible for summer cooling. Like all Lewis units, the H-2 is equipped with a Humitrol, solenoid water valve, and heat switch, for automatic positive control of humidification.

A metal cabinet, in natural wood finish, may be had for installation in the hallway of a home, or in office, shop, or other area. The same unit, without cabinet, can be placed in the basement and the air circulated to living quarters through ducts with outlets and intake grilles flush with baseboard or wall.

Dimensions of the cabinet unit are: width, 33 in., depth, 10½ in., and height, 31½ in. The unit evaporates ¾ to 1½ gallons per hour, and has a heating capacity equivalent to one radiator.

The Lewis GC (gravity conversion) series of conditioners come in three sizes, to meet varying gravity warm air requirements. These units make it possible to convert an ordinary gravity-type furnace into a modern winter

air-conditioning heating plant. Air filtration and circulation are also provided for summer use, and coils may be installed if complete cooling and dehumidification are desired.

Standard equipment with all Lewis warm air conversion units is a spray-type humidifier. Inserted in the furnace jacket and connected with the water supply, this device supplies humidification to the heated air in the free air space of the furnace.

Operation of the humidifier is as follows: A needle spray is forced through the small nozzle leading from the water connection, strikes a tile at an angle, and breaks into an enveloping mist, which is picked up by the heated air.

Degree of humidification is controlled automatically by the Humitrol, located in the living quarters of the home, and the solenoid valve on the humidifier attachment.

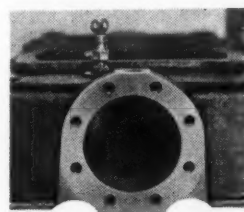
Apartment Houses to Be Conditioned within 10 Years—Realtor Says

NEW YORK CITY—Apartment houses generally will be air conditioned within 10 years, although for a while it is likely that the use of such equipment will be restricted largely to individual units installed by wealthy tenants at their own expense, thinks William J. Demorest, new president of Real Estate Board of New York.

Mr. Demorest believes, however, that it will be "many years" before the average person "will be willing to go to sleep at night with closed windows, depending entirely on a mechanical device for ventilation."

He is convinced that there will be marked progress in housing construction, maintenance, and operation within the next 10 or 20 years, because this field has been comparatively slow in making radical changes recently.

20 QUALITY FEATURES



(No. 2)

Servel's Liquid Level Test Cock Provides an Instant Check on the Refrigerant Charge, Cuts Service Time in Half.

WINTER OR SUMMER . . .

Servel equipment operates steadily, faithfully . . . Refinement in every detail saves the dealer the cost and annoyance of petty "adjustment" calls. Built-in stamina insures the user many years of uninterrupted service. Season after season, Servel's complete dependability pays bigger dividends to users—in economy and satisfaction; to dealers—in new sales and profits . . . A few choice territories are open at this time.

SERVEL

COMMERCIAL REFRIGERATION

SERVEL, INC. Commercial Refrigeration Division EVANSVILLE, IND.

This modern 33-acre plant is the home of Servel Commercial Refrigeration and the world-famous Electrolux, the Servel Gas Refrigerator



There is no Substitute for Experience

AIR CONDITIONING

Standard Tests Used in Rating Air-Conditioning Equipment

Leading technical and trade associations have cooperated in the formulation of "Standard Methods for Rating and Testing Air Conditioning Equipment," the second part of which is published on this and pages 14 and 16. First part of the complete text of these Standards was published in the Nov. 20 issue.

The American Society of Refrigerating Engineers, American Society of Heating and Ventilating Engineers, Air Conditioning Manufacturers' Association, Refrigerating Machinery Association, and the Refrigeration Division of the National Electrical Manufacturers Association, were represented on the Joint Committee sponsoring these Standards, which have had the formal approval of the trade associations.

The Standards, which may be subject to some further minor revision, represent the collaboration and best thought of the leading air-conditioning technicians. The work is broad and exhaustive, and the Joint Committee believes it will prove of incalculable value to the makers and users of air-conditioning equipment.

These Standards are applicable to both summer and winter air conditioning.

Computation of Results

3. Computation of Results.

a. Basis of Computation. Results shall be computed essentially in the manner outlined in the typical computation following.

(1) Air capacity to be used in the rating of free delivery type units shall be the air capacity determined by test and corrected to standard rating conditions.

(2) Air capacity to be used in the ratings of pressure type units may differ from the corrected test determinations by not more than plus or minus 5 per cent.

(3) Correction of the total cooling, sensible cooling, and dehumidifying effects from the test conditions of entering air and refrigerant temperatures to the standard basis of rating shall be made in a direct linear proportion to the six-tenths power of the air capacity variation between the test and rating quantities, as shown in the typical computation following; provided, however, that the deviations are within the specified test limits.

Explanation of Symbols

b. Symbols.

(1) Primary Symbols.

"A" Receiving chamber nozzle area, square feet.

"C" Specific heat of the liquid, B.t.u. per pound per degree F.

"c.f.m." Air volume flow rate, cubic feet per minute.

"Em" Fan motor and drive efficiency.

"G" Air weight flow, pounds per minute.

"H" Moisture content of air, pounds water per pound of dry air.

"I" Total heat content of a mixture of air and water vapor, B.t.u. per pound of dry air.

"K" Receiving chamber orifice discharge coefficient.

"L" Flow of non-volatile refrigerant, pounds per minute.

"N" Power input to fan motor, watts.

"P" Velocity pressure of air at the nozzle throat or the static pressure difference across the nozzle, inches water gauge.

"Q" Condensing unit capacity between points where refrigerant enters and leaves cooling unit, B.t.u. per hour.

"Q_a" Heat absorbed by brine, B.t.u. per hour.

"Q_d" Dehumidifying effect, B.t.u. per hour.

"Q_r" Heat generated by the fan, B.t.u. per hour.

"Q_t" Heat transmission gain, B.t.u. per hour.

"Q_s" Sensible cooling effect, B.t.u. per hour.

"Q_c" Total cooling effect, B.t.u. per hour.

"t" Dry bulb temperature, degrees F.

"t_w" Wet bulb temperature, degrees F.

"t_b" Brine temperature, degrees F.

"t_r" Refrigerant temperature, degrees F.

"V" Specific volume of air and water vapor mixture, cubic feet per pound of dry air.

"Δ" Deviation in per cent.

(2) Subscript symbols.

"1" Property of fluid entering the unit.

"2" Property of fluid leaving the unit.

"c" Confirming test.

"R" Value to be used in rating the unit.

"x" Property of the air corrected to standard density of 0.07488 pounds per cubic foot.

c. Formulas.

(1) Primary test.

The outlet air flow will be

$$c.f.m._2 = 1098 AK (P/V_{22})^{0.5} \quad (1)$$

V₂₂ can be obtained from the psychrometric chart and substituted in the following to correct the air flow to standard air conditions:

$$c.f.m._2 = \frac{c.f.m._2}{V_{22}} \quad (2)$$

$$G_{22} = \frac{c.f.m._2}{V_{22}} \quad (3)$$

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remote from the air conditioned room. Equation (5) is for units which have fan motors external to the air stream but in the air conditioned room.

$$Q_o = 60G_{22}(i_1 - i_2) \quad (4)$$

$$Q_o = 60G_{22}(i_1 - i_2) - 3.42(1 - E_m)N \quad (5)$$

If H₁ and H₂ are the moisture contents of the inlet and outlet air in pounds water per pound of dry air, the dehumidifying effect at test conditions will be

$$Q_d = 1060 \times 60 \times G_{22}(H_1 - H_2) \quad (6)$$

The values of H₁ and H₂ are to be obtained from psychrometric tables by using the wet and dry bulb temperatures.

Then the sensible cooling effect at test conditions will be

$$Q_s = Q_o - Q_d \quad (7)$$

Correcting the total cooling effect for deviation of air and refrigerant temperature and of air capacity from the specified rating conditions.

$$Q_{or} = Q_o \left[\frac{t'_{1R} - t_{1R}}{t_1 - t_r} \right] \left[\frac{c.f.m._{2R}}{c.f.m._2} \right]^{0.6} \quad (8)$$

Correcting the sensible cooling effect to rating conditions,

$$Q_{sR} = Q_s \left[\frac{t_{1R} - t_{rR}}{t_1 - t_r} \right] \left[\frac{c.f.m._{2R}}{c.f.m._2} \right]^{0.6} \quad (9)$$

the dehumidifying effect for rating will be

$$Q_{dR} = Q_d - Q_{sR} \quad (10)$$

The deviation between test and rated

air capacity, allowed for pressure type units only,

$$\Delta c.f.m. = 100 \left[\frac{c.f.m._{2R} - c.f.m._2}{c.f.m._2} \right] \quad (11)$$

shall be less than plus or minus 5 per cent.

(2) Confirming test—volatile refrigerant.

If the fan motor is not in the air stream and is external to the air conditioned room, the heat introduced into the air stream will be,

$$Q_r = 3.42 N E_m \quad (12)$$

but if the fan motor is in the air stream or in the air conditioned room, the heat introduced into the air stream and room will be,

$$Q_r = 3.42 N \quad (13)$$

Then, obtaining the condensing unit capacity from the calibration curve and approximating the heat transmission gain, the confirming total cooling effect is

$$Q_{oc} = Q' - Q_r - Q_d \quad (14)$$

The deviation in the total cooling effect

$$\Delta Q_o = 100 \left[\frac{Q_{oc} - Q_o}{Q_o} \right] \quad (15)$$

shall not be greater than 5 per cent.

(3) Confirming test—non-volatile refrigerant.

The heat absorbed by the brine will be

$$Q_a = 60 CL (t_{b2} - t_{b1}) \quad (16)$$

The confirming total cooling effect will be

$$Q_{oc} = Q_o - Q_r - Q_d \quad (17)$$

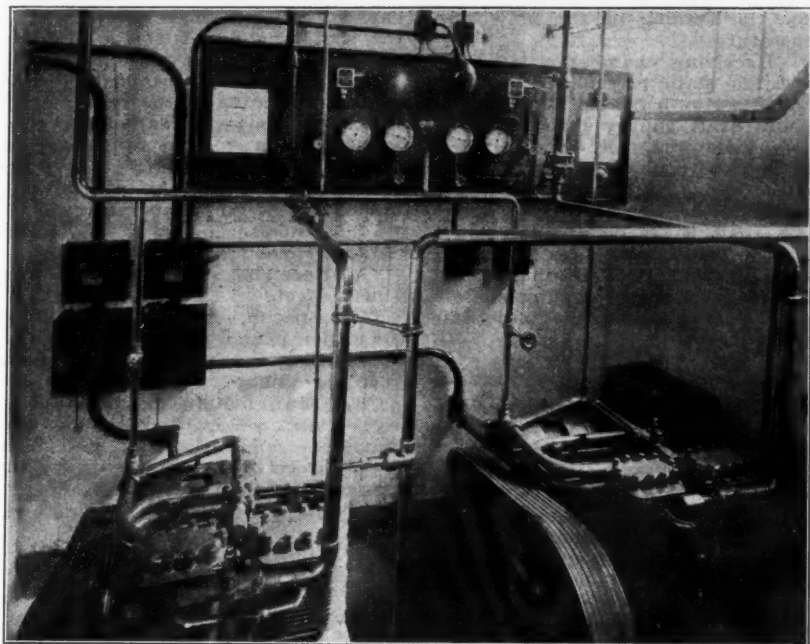
The deviation in the total cooling effect,

$$\Delta Q_o = 100 \left[\frac{Q_{oc} - Q_o}{Q_o} \right] \quad (18)$$

shall not be greater than 5 per cent.

(4) Typical Data.

Keeps Office Workers Efficient



Two Lipman refrigeration machines, one 7 1/2-hp. capacity and the other 10 hp., furnish cool air for the main offices of Daniel Reeves, Inc., New York City food chain. The machine room is shown above.

Virginia Utility Conditions Office All Year With Reverse-Refrigeration System

WILLIAMSBURG, Va.—When the management of the Virginia Electric & Power Co. here faced the proposition of moving their power plant, due to certain restoration plans for this one-time capital city of Virginia, it was decided to try out the heat pump, or reversed refrigeration cycle, system of air conditioning.

In conjunction with its power plant, the company operated an ice making plant, so in the design of the new building they laid out a York refrigerating system which would provide a total of 38.3 tons of refrigeration for ice making and air conditioning.

As now installed the system performs these operations, and in addition heats the building in winter by reversing the refrigeration cycle as a heat pump. This arrangement permits the company to make very effective use of the condenser water heat otherwise wasted by an ice plant in the winter.

Air-conditioned rooms include the service department, the meter department, the superintendent's office, the engineering department, and the hallway and showrooms. These rooms have a total area of 2,800 sq. ft., and contain 30,800 cu. ft. of space.

Equipment includes two vertical-type York ammonia compressors, an ice freezing tank, shell and tube condensers, and a special York central station air-conditioning unit.

In summer the refrigerating plant makes ice and refrigerates the ice storage room as well as cooling the air-conditioned rooms, the heat extracted from these sources being discharged to the outside atmosphere by means of the spray pond on the roof of the building.

For winter operation, certain valves are turned so as to change the flow in certain portions of the system. Thus, instead of cooling the hot condensing water from the ice making and storage system by means of a spray pond, this hot water is circulated through the air-conditioning coils in order to heat the building.

Because of the fact that the heat extracted from the ice freezing tank and storage room is not alone sufficient to heat the building in the winter, a third evaporator coil is installed on the roof. Here ammonia is evaporated, the heat removed from the cold outdoors being pumped indoors through the refrigerating system, and eventually, in the form of an increased supply of hot condensing water, is delivered to the air-conditioning coils.

Winter temperatures are automatically maintained by two thermostats. The first is set for a temperature below 70° F., and starts a 20 g.p.m. pump, operated by a 1/4-hp. motor which supplies hot condensing water to the coils in the central type air-conditioning unit.

If the air temperature continues to fall and the heat given off by the

condensing water being circulated through the air-conditioning coils is unable to maintain a room temperature above 68° F., the second thermostat turns on a 30 kw. electric heater which is built into the air conditioner.

Finally, if a high temperature is desired in any of the rooms for some special reason, a thermostat in that room is provided to turn on a small electric wall type heater. There are 10 of these booster heaters installed in the building, each consisting of a 2 kw. heating element and a low velocity fan.

During the past winter season it was found that these auxiliary heaters were almost never used.

To maintain a relative humidity of approximately 40 per cent in the air-conditioned spaces during the winter time, a fine water spray in the air-conditioning unit is employed. This is controlled by a humidistat.

The air-conditioning unit is a York vertical type, housing a centrifugal fan at the top, finned surface coils for heating and cooling, a removable dry filter for cleaning the air, a 30 kw. electric heater in three sections of 10 kw. each for emergency heating, and spray nozzles at the bottom for adding moisture to the air in order to maintain the desired humidity in winter.

The blower circulates 4,000 c.f.m. through the unit, forcing the air through ducts which distribute the conditioned air to the various rooms by means of grilles near the ceiling.

Return air is taken out of the rooms through grilles in the baseboards, and passes through the hallway back to the air-conditioning unit. The system provides eight air changes per hour, using about 12 per cent of outside air.

When the air temperature reaches 80° F. in the summer, a thermostat starts a 60 g.p.m. pump in the ice plant in order to start circulation of cold brine through the cooling coils in the conditioning unit. Thus the air is kept at 80° F. and 50 per cent relative humidity during the hot summer months, with a control arranged to prevent a greater differential than 15° between indoor and outdoor temperatures, a modern practice to avoid the sensation of "shock" to human beings when entering and leaving conditioned spaces where a greater temperature difference prevails.

Inasmuch as the air-conditioned building is a one-story structure, the roof, walls, and floors were all insulated, and weather-stripped windows and snug fitting doors provided, not only to decrease the cost of heating and cooling, but also to improve the relative humidity and insure uniformity of temperatures throughout. Venetian blinds were furnished at all windows.

The system is affording engineers of the Virginia Electric & Power Co. and the York Ice Machinery Corp. an opportunity to study the operation and economies possible with the reversed cycle of refrigeration.

Conditioner Placed in Food Chain Office

NEW YORK CITY—Lipman air-conditioning equipment has been installed in the main offices of Daniel Reeves, Inc., at 44 West 143rd St. here. The company operates 100 food markets in New York City, Westchester county, and several Connecticut cities. All of the stores are users of Lipman commercial refrigeration equipment.

Conditioned space in the Reeves main office is 196 ft. long, 33 ft. wide, and 11 ft. high. The system is designed to maintain a constant temperature of 75° F., both summer and winter.

Cooling coils are hung from the ceiling of the floor below the office, connected to two Lipman refrigeration machines, of 7 1/2 and 10-hp. capacity. Sweat fittings are used to make the pipe connections in the machine room.

Installation was made by Lipman Corp.'s New York City branch office, since General Refrigeration Sales Co. does not do business in New York state.

South Bend Hotel Adds To Installation

SOUTH BEND, Ind.—Convinced that air conditioning pays off in cash as well as comfort, the Hoffman hotel here has decided to enlarge the equipment installed last summer to cool its lobby and coffee shop so as to take care of its new tap room, main dining room, and private dining rooms.

Lipman models 10-4000 and 5-2000 self-contained conditioners are to be used for the job. The previously installed equipment was also Lipman-made. Sale and installation was made by Northern Indiana Distributing Co.

Illinois Medical School To Study Effects of Air Conditioning

CHICAGO—To determine air conditioning's effect on health, and in the treatment of hay fever, asthma, and similar physical disorders, the College of Medicine of the University of Illinois is conducting a series of tests and experiments in cooperation with the American Society of Heating and Ventilating Engineers.

Dr. Robert W. Keeton, who is directing the tests for the university, states that the plan is to study a group of normal individuals under four different types of climate. These climate classifications are: a cool, dry atmosphere with a temperature of 70-72°, humidity 30 per cent; a cool moist atmosphere of 70-72°, humidity 60 per cent; a hot dry atmosphere of 92-96°, humidity 20 to 30 per cent; and a hot moist atmosphere with a 92-96° temperature, and humidity of 60 per cent upward.

"Efficiency of circulation will be the chief concern of the study," Dr. Keeton said. "Elimination of heat is a major problem with the body. As soon as this is made difficult, there is some form of circulatory adjustment."

"Other functions that can be studied under the same atmospheric changes include mental efficiency tests, appetite and gastro-intestinal behavior."

Minneapolis Bank Installs Auditorium System

MINNEAPOLIS—Auditorium air-conditioning equipment has been installed in the officers' quarters of the Northwestern National Bank here by Conditionedaire, Inc., Minneapolis contractor for Auditorium systems.

Cigar Firm Adds to Conditioning System

PHILADELPHIA—Bayuk Cigars, Inc., took what was considered a "pioneer" step in the cigar industry five years ago when it installed a Frick refrigerating system to provide the large amount of cold water needed in processing the tobacco leaf and in conditioning the treatment rooms. Installation of the unit was made by the Mack Machine Co. of Pennsylvania, Philadelphia distributor for the Frick Co.

This year the company, needing additional cold water, installed a duplicate but larger outfit, comprising a 7 by 7 Frick machine and zig-zag coil—4 pipes high by 14 pipes wide by 7 1/2 ft. long. Each cooler is controlled by a float valve and is enclosed in an insulated housing.

Connected to the electric control valve, which opens the by-pass on the large machine, is a device which registers the number of times the valve clicks on and off, enabling the engineer to check the frequency of operation over a long period.

The system works at a high suction pressure, averaging 33 lbs., and cools about 40 gals. of water per minute from 65° to 52° F. by means of an instant cooler. Operation is automatic.

All manufacturing areas and offices of the Bayuk plant are air conditioned during both summer and winter. A 3-cylinder Frick low-pressure unit to furnish cooling is connected to a finned-tube cold diffusing unit in the company physician's office. Similar cold diffusers maintain comfortable conditions in the adjoining dispensary and in departmental offices on the floors above and below.

Thermostats in each office operate solenoid valves which admit refrigerant to the cold diffuser.

ARCO

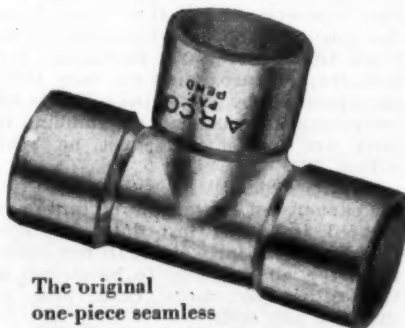
PIPE AND FITTING COOL TOGETHER

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The Copper to Copper Connection in Air Conditioning is Vibration proof, Leakproof and Foolproof

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SAFE WITH ANY TYPE
OF REFRIGERANT
•
EASILY MADE
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FOR EVERY AIR CONDITIONING
REQUIREMENT



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WROUGHT COPPER TEE
• In all sizes from 1/4" up, with many reduction sizes on the branch.

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WHEREVER you use copper pipe in air conditioning and refrigeration, the safe joint is made with Arco Full Flow Wrought Copper Fittings. The copper to copper connection is proof against leak or vibration; it is non-porous; it will handle any refrigerant gas without loss; it is safe against strain or pressure; it is stronger than the pipe itself.

Because Arco Fittings are copper like the pipe they join, every co-efficient of pipe and fittings is identical. They heat and cool at the same rate. They expand

and contract together. They react alike to every chemical and physical condition.

But in addition to these technical advantages, there are advantages in price. Arco Fittings are quick and easy to use. They add a saving in time. Get the facts. It will pay you. A representative will be glad to call if you write or wire—

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AIR CONDITIONING

Standard Tests on Refrigeration & Heating Equipment for Air-Conditioning Systems

(Continued from Page 12, Column 5)
ther illustrate the recommended form for computations, the results of the typical test data are substituted in the formulas and the required rating data determined.

Test No. 1—Volatile Refrigerant

Since the receiving chamber with impact nozzle method was used to determine the air flow, the test air capacity is

$$c.f.m._2 = 1098 \times 0.545 \times 0.99 (0.845 \times 13.27)^{0.5} = 1985 \quad (1)$$

Correcting to standard air conditions,

$$c.f.m._2 = \frac{1985}{0.07488 \times 13.27} = 2020 \quad (2)$$

and the air weight flow is

$$G_{a2} = \frac{1985}{13.27} = 149.5 \quad (3)$$

Then the total cooling effect at test conditions is

$$Q_0 = 60 \times 149.5 (31.26 - 23.40) = 70,600 \quad (4)$$

The dehumidifying effect at test conditions is

$$Q_d = 60 \times 1060 \times 149.5 (0.0111 - 0.0083) = 26,500 \quad (5)$$

The sensible cooling effect at test conditions is

$$Q_s = 70,600 - 26,500 = 44,100 \quad (6)$$

Correcting to rating conditions, the total cooling effect is

$$Q_{0R} = (70,600) \left[\frac{67 - 40}{67.1 - 39.8} \right] \left[\frac{2000}{2020} \right]^{0.6} = 69,400 \quad (7)$$

and the corrected sensible cooling effect is

$$Q_{sR} = 44,100 \left[\frac{80 - 40}{80.5 - 39.8} \right] \left[\frac{2000}{2020} \right]^{0.6} = 43,100 \quad (8)$$

so that the corrected dehumidifying effect is

$$Q_{dR} = 69,400 - 43,100 = 26,300 \quad (9)$$

The deviation of the air flow is

$$\Delta c.f.m. = 100 \left[\frac{2020 - 2000}{2000} \right] = 1\% \quad (10)$$

which is within the allowable limit.

Since the fan motor is not in the air stream and is not in the air conditioned room the heat added by the fan is

$$Q_f = 3.42 \times 1190 \times 0.49 = 1990 \quad (11)$$

Calibration curves for the condensing unit show that when operating at 606 r.p.m. with a discharge pressure of 105 lb. per sq. in. gauge, a suction pressure of 23.8 lb. per sq. in. gauge, a suction vapor temperature of 42° F. and a liquid refrigerant temperature of 88° F., the condensing unit capacity, Q_c is 73,200 B.t.u. per hour. The heat transmission gain, Q_t , was estimated to be 800 B.t.u. per hour. Then the confirming total cooling effect is

$$Q_{cc} = 73,200 - 1990 - 800 = 70,400 \quad (12)$$

and the deviation between the primary and confirming tests is

$$\Delta Q_c = 100 \left[\frac{70,600 - 70,400}{70,600} \right] = 0.3\% \quad (13)$$

which is within the allowable limit.

Test No. 2—Non-Volatile Refrigerant

The receiving chamber with impact nozzle method was used to determine the air flow. The air capacity during the test is

$$c.f.m._2 = 1098 \times 1.733 \times 0.99 (2.35 \times 12.50)^{0.5} = 10,200 \quad (1)$$

Correcting to standard air conditions

$$c.f.m._2 = \frac{10,200}{0.07488 \times 12.50} = 11,050 \quad (2)$$

and the air weight flow

$$G_{a2} = \frac{10,200}{12.50} = 815 \quad (3)$$

Then the total cooling effect at test conditions is

$$Q_0 = 60 \times 815 (14.44 - 12.47) = 96,200 \quad (4)$$

The dehumidifying effect at test conditions is

$$Q_d = 60 \times 1060 \times 815 (0.0044 - 0.00405) = 18,100 \quad (5)$$

The sensible cooling effect at test conditions is

$$Q_s = 96,200 - 18,100 = 78,100 \quad (6)$$

Correcting to rating conditions, the total cooling effect is

$$Q_{0R} = 96,200 \left[\frac{38.1 - 25}{38.3 - 25.4} \right] \left[\frac{11,000}{11,050} \right]^{0.6} = 97,500 \quad (7)$$

and the corrected sensible cooling effect is

$$Q_{sR} = 78,100 \left[\frac{40 - 25}{40.6 - 25.4} \right] \left[\frac{11,000}{11,050} \right]^{0.6} = 77,100 \quad (8)$$

so that the corrected dehumidifying effect is

$$Q_{dR} = 97,500 - 77,100 = 20,400 \quad (9)$$

The deviation in the air flow is

$$\Delta c.f.m. = 100 \left[\frac{11,050 - 11,000}{11,000} \right] = 0.45\% \quad (10)$$

which is within the allowable limit.

The brine orifice calibration curve shows that the brine flow, "L," is 621 pounds per minute. The heat absorbed by the brine is

$$Q_b = 60 \times 0.772 \times 621 (28.8 - 25.4) = 97,800 \quad (11)$$

No heat was added to the air by a fan and the heat transmission gain, Q_t , was estimated to be 1,000 B.t.u. per hour so that the confirming total cooling effect is

$$Q_{bc} = 97,800 - 0 - 1000 = 96,800 \quad (12)$$

and the deviation between the primary and confirming tests is

$$\Delta Q_c = 100 \left[\frac{96,800 - 96,200}{96,200} \right] = 0.6\% \quad (13)$$

which is within the allowable limit.

(d) Rating Information from Typical Calculations.

(1) Comfort cooling rating for volatile refrigerant air cooling and filtering unit.

Name Model X Cooling Unit

Type Pressure

Functional elements Cooling Coil, Air Filters

Refrigerant Freon (dichlorodifluoromethane)

Temperature of refrigerant vapor leaving cooling unit 48° F.

Air capacity (Std.) 2,000 c.f.m.

Sensible cooling effect 43,000 B.t.u. per hour

Dehumidifying effect 26,300 B.t.u. per hour

Total cooling effect 69,400 B.t.u. per hour

Fan motor output 1,190 watts

Air resistance of unit 0.40 in. of water

(2) Comfort cooling rating for non-volatile refrigerant air interchanger.

(Since the presentation is essentially the same as for (1) above, it is not repeated.)

Testing Heating Equipment

F. Testing Heating Equipment

1. Basis of Test. The tests shall be made by the method prescribed in the "ASHVE Standard Code for Testing and Rating Steam Unit Heaters."

a. Steam Heating.

(1) Primary test, which is to be used for the rating. The heating capacity shall be determined by weighing the condensate formed in a measured time, and the air capacity shall be determined from the temperature rise obtained and the condensate formed during the test. The method prescribed in the ASHVE Standard Code for Testing and Rating Steam Unit Heaters shall be followed.

(2) Confirming test. The air capacity may be determined by one of the methods specified under D 2, "Apparatus for Air Measurements." The heating capacity shall be obtained from the rate of flow, specific heat and temperature rise of the air. The results of this test shall be within 5 per cent of those of the primary test, but the primary test shall govern the rating.

b. Hot Water Heating.

(1) Primary test which is to be used for the rating. The air capacity shall be obtained by direct measurement using one of the methods specified under D 2, "Apparatus for Air Measurements." The heating capacity shall be determined from the rate of flow, specific heat and temperature rise of the air through the unit.

(2) Confirming test. The heating capacity shall be obtained by measuring the heat abstracted from the heating fluid. The results must agree within 5 per cent of those of the primary test, but the primary test shall govern the rating.

c. Procedure for Test

2. Procedure

a. Steam Heating. The procedure for these tests should follow the specifications set forth in the "ASHVE Standard Code for Testing and Rating Steam Unit Heaters."

b. Hot Water Heating

(1) Air temperatures. Obtain and maintain standard inlet air conditions. The arithmetic average of all dry bulb temperatures shall not vary from the specified dry bulb temperature by more than 1° F. and individual dry bulb temperatures shall not vary from the specified by more than 2° F. All temperature measuring instruments in inlet and outlet air must be read within 0.1° F.

(2) Air capacity measurements. The air capacity of pressure type units calculated from the test data and corrected to standard air shall not differ from the air capacity to be shown in the rating by more than plus or minus 5 per cent.

(a) Receiving chamber with impact nozzle. The static pressure in the receiving chamber as indicated by the static pressure draft gauging shall be maintained at zero for free delivery units. This shall be done by controlling the exhaust fan. The manometers for measuring the pressure across the

nozzle shall be read to within 0.005 inches of water each time a general reading is made. This reading should immediately precede or immediately follow the reading of the outlet air temperature.

(b) Receiving chamber with static nozzle. The static pressure in the mixing chamber as indicated by the static pressure draft gauges shall be maintained at zero for free delivery units. This shall be done by controlling the exhaust fan. The manometers for measuring the pressure across the nozzle shall be read to within 0.005 inches of water each time a general reading is made. This reading should immediately precede or immediately follow the reading of the outlet air temperature.

Resistances of Interchangers

(3) Air resistances of interchangers and pressure type units shall be measured by at least one static pressure tube traverse, so made that a representative average of the resistance is obtained. The resistance of the heating coil shall be taken when operating at the standard conditions of rating; and that of filters and screens shall be taken as twice that of clean filters or screens. At least one reading shall be taken for every square foot of cross-sectional area, but in no case shall less than six readings be taken.

(4) Hot liquid temperatures. Inlet and outlet liquid temperature measuring instruments shall be read to 0.1° F. The hot water inlet temperature shall not be permitted to vary more than 0.5° F. from the specified during the test, and the rate of flow shall not vary more than 1 per cent. The inlet and outlet instruments shall be reversed every reading.

(5) Hot water flow shall be measured by the weight method, a calibrated orifice or a calibrated flow meter.

(6) Pressure drop shall be measured by a mercury manometer twice during the test. Before reading it should be determined that the manometer is in balance and the connections are free from air. The manometer should be read to within 0.1 inch of mercury.

(7) Fan speed shall be maintained within plus or minus 2 per cent of rated speed and the speed shall be measured at the beginning and end of the test.

(8) Watts input to the fan motor (and pump motor, if any) shall be taken at the beginning and at the end of the test by a watt meter.

(9) Barometric pressure shall be read once during the test.

(10) Duration of test during which all conditions shall be maintained within the previously specified limits shall not be less than one hour. If readings fluctuate beyond the specified limits, the test shall be continued until the readings have been stabilized within these limits for a period of one hour.

(11) Readings shall be taken at least every 10 minutes unless specified to the contrary, and a total of at least seven readings shall be taken.

Symbols Used in Formulae

3. Computation of Results.

a. Heating with Steam. The results shall be computed and corrected to standard rating conditions in the manner prescribed in the A.S.H.V.E. Standard Code for Testing and Rating Steam Unit Heaters.

b. Heating with hot water. The results shall be computed by the use of the formulas following.

(1) Free delivery units shall be rated at the air capacity obtained in the test.

(2) Pressure type units shall be

rated at an air capacity varying not more than 5 per cent from the air capacity obtained in the test. The results may be corrected to the rated capacity in the direct proportion to the six-tenths power of the test and rated air capacities.

(3) Correction of the heating capacity for variation of the inlet air and hot water temperatures may be made in proportion to the difference between the inlet air temperatures and the arithmetic average of the inlet and outlet water temperatures.

(4) Symbols.

"A" Primary symbols.

"A" Receiving chamber orifice area, square feet.

"C" Specific heat of the liquid, B.t.u. per pound per degree F.

"c.f.m." Air volume flow rate, cubic feet per minute.

"E_m" Fan motor efficiency.

"G" Air weight flow, pounds per minute.

"K" Receiving chamber orifice discharge coefficient.

"L" Flow of hot water, pounds per hour.

"N" Power input to fan motor, watts.

"P" Velocity pressure of air at the nozzle-throat or the static pressure difference across the nozzle.

"Q" Heat generated by fan, B.t.u. per hour.

"Q_t" Heat transmission loss, B.t.u. per hour.

"Q_h" Heating effect, B.t.u. per hour.

"Q_w" Heat absorbed by water, B.t.u. per hour.

"t" Dry bulb temperature, degrees F.

"t_w" Hot water temperature, degrees F.

"V" Specific volume of air and water vapor moisture, cubic feet per pound.

"Δ" Deviation in per cent.

"b" Subscript symbols.

"1" Property of air or water entering unit.

"2" Property of air or water leaving unit.

"c" Confirming test.

"R" Value to be used in rating the unit.

"x" Property of air corrected to standard density of 0.07488 pound per cubic foot.

(5) Formulas.

(a) Primary test outlet air flow will be

$$c.f.m._2 = 1098AK(P \cdot V_2)^{0.5} \quad (1)$$

V₂ should be obtained from the psychrometric chart and substituted in the following to correct the air flow to standard conditions.

$$c.f.m._2 = \frac{c.f.m._2}{0.07488V_2} \quad (2)$$

The air weight rate will be

$$G_{a2} = \frac{c.f.m._2}{V_2} \quad (3)$$

The heating effect under test conditions will then be

$$Q_0 = 60G_{a2}(0.238)(t_2 - t_1) \quad (4)$$

Correcting the heating effect for deviation of air and water temperatures and air flow, the rated heating effect will be

$$Q_R = Q_0 \left[\frac{t_{w1} + t_{w2} - t_1}{2} \right] \left[\frac{c.f.m._{2R}}{c.f.m._2} \right]^{0.6} \quad (5)$$

The deviation between the test and rating air capacities,

$$\Delta c.f.m. = 100 \left[\frac{c.f.m._2 - c.f.m._{2R}}{c.f.m._{2R}} \right] \quad (6)$$

(Concluded on Page 16, Column 1)



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The entry of Perfection into the refrigeration parts field was no mere accident. We knew that there was a demand for a complete line of dependable replacement parts that the independent dealer could buy at full trade discount through the jobber—and our 1936 set-up has been developed to meet these replacement needs.

Perfection, backed with more than 15 years experience manufacturing automotive replacement parts, already

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The advantages of ample finances, sound engineering, vast production facilities, specialized experience in manufacturing and selling replacement parts, and a knowledge of the problems and needs of both the jobber and independent service man are clearly reflected in the Perfection set-up.

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Since we announced the formation of the Perfection Refrigeration Parts Co., as a new division of the Perfection Gear Company, many aggressive, outstanding jobbers have written for our proposition.

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PERFECTION REFRIGERATION PARTS CO.
(A division of the Perfection Gear Company, Established 1919)
HARVEY, ILLINOIS



PERFECTION Certified Replacement Parts
for popular makes of refrigeration units



YES—and many other commercial businesses—fruit and produce stores, restaurants, florists, soda fountains, taprooms—will be interested in the low price of the new, low pressure A-E-CO units for refrigeration and air condition-

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MASTER SERVICE MANUAL

Chapter 9—Service

Service Complaints & Operations On Type 1B & 1C Flooded Systems

By K. M. Newcum

Complaints on Type '1B' Flooded Systems

Type "1B" system is the same as type "1A" except that the evaporator is not equipped with shut-off valves Nos. 4 and 5. See Fig. 3.

Inasmuch as the service shut-off valves only come into play when the system is actually being serviced, all of the service complaints on "1B" systems will be exactly the same as those given for "1A."

Service Operations on Type '1B' Flooded Systems

Many of the service operations will be the same as on type "1A" systems, and reference will be made to those operations whenever possible to avoid repetition.

The following operations are given with the understanding that the liquid and suction line connections at the evaporator are of the flared tube type. However, in some cases the lines are connected to the connections with a soldered joint—so no reference will be made to the type joint. Thus when instruction is given to remove or disconnect the liquid or suction line, or reconnect them, the service man will use the method that fits the particular job in question, and proceed regardless of the type of joint.

Service Operation No. 1:
Evacuating the Liquid Line
a. Proceed as in Operation No. 11 (type "1A") through steps a, b, c, d, e, f.
b. Close valve No. 1.
c. The liquid line, suction line, and evaporator are evacuated and the liquid line may now be disconnected if desired.

Service Operation No. 2:
Evacuating the Suction Line
a. Proceed as above in operation 1 a and 1 b.

b. The suction line may be disconnected if desired.

Service Operation No. 3:
Purging Air from Liquid Line
a. With liquid line evaporator and suction line empty, close valve No. 1 and loosen suction line connection at valve No. 1.
b. Crack valve No. 3 and pressure from liquid receiver will purge air through liquid line, evaporator, and suction line.
c. When refrigerant is noticed at loosened connection at valve No. 1, tighten connection and close valve No. 3.

Service Operation No. 4:
Purging Suction Line
a. Proceed as above in operation 3.

Service Operation No. 5:
Testing for Leaks
a. Same as operation 5, type "1A."

Service Operation No. 6:
Purging Air from Condenser
a. Same as operation 6, type "1A."

Service Operation No. 7:
Adding Refrigerant to Low Side
a. Same as operation 7, type "1A."

Service Operation No. 8:
Adding Oil to Compressor
a. Same as operation 8, type "1A."

Service Operation No. 9:
Changing the Evaporator
a. Proceed as in operation 11, type "1A," through steps a, b, c, d, e, and f.
b. Disconnect liquid and suction lines from evaporator and remove evaporator.
c. Install new evaporator and reconnect liquid and suction lines.
d. Purge liquid line, evaporator, and suction line as in operations 3 and 4.
e. Test for leaks as in operation 6.
f. Open valves Nos. 1 and 3 and put compressor into operation.

Type '1B' Flooded System

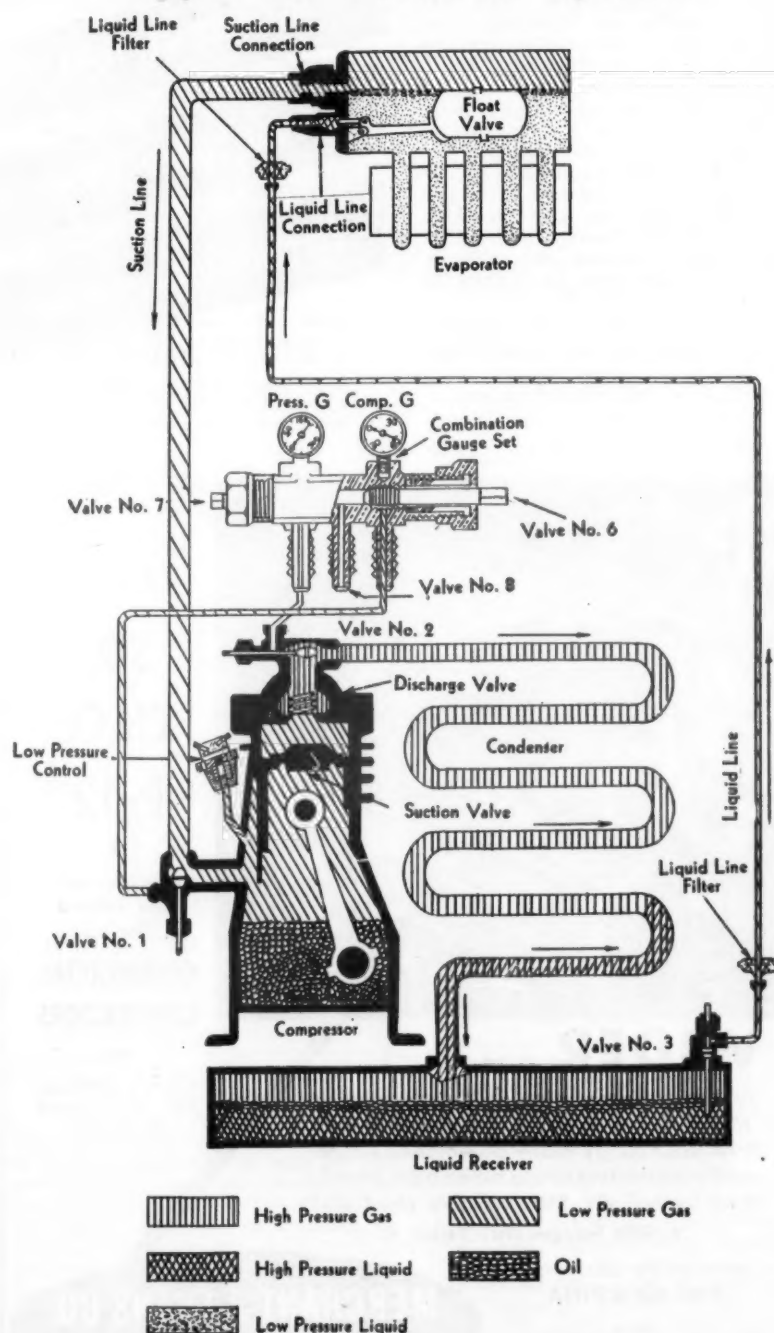


Fig. 136—Type 1B flooded system using low side float valve, low pressure control, and the evaporator is not equipped with evaporator service valves.

Summary of Instalments Published Previously

A summary of previous instalments of the Master Service Manual follows:

Chapter 1—Theory of Refrigeration (April 10).

Chapter 2—Principles of Mechanical Refrigeration (April 17).

Chapter 3—Common Refrigerants (April 24).

Chapter 4—Condensing Units.

May 1—Description of compressor parts.
May 8—Stuffing box seals, flywheels, and direct-connected units.

May 29—Rotary compressors.

June 5—Care and servicing of shut-off valves and gaskets.

June 12—Condensers.

June 19—Liquid receivers.

Chapter 5—Evaporators.

June 26—Flooded evaporators with low side float valve.

July 3—High side float valves and flooded evaporators.

July 10—Automatic expansion valves.

July 17—Automatic expansion valves—continued.

July 24—Thermostatic expansion valves.

Chapter 6—Controls.

July 31—Low pressure controls.

Aug. 7—Low pressure controls—continued.

Aug. 14—Thermostatic controls.

Aug. 31—Thermostatic controls—continued.

Chapter 7—Motors.

Aug. 28—Repulsion start-induction run motors.

Sept. 4—Repulsion start-induction run motors (continued) and capacitor motors.

Sept. 11—Direct current motors and belts.

Chapter 8—Installation.

Sept. 18—Installation of refrigerators.

Sept. 25—Correct use of fittings in making joints.

Chapter 9—Service.

Oct. 16—Classification of systems and use of combination gauge set.

Oct. 23—Service complaints and remedies on Type 1A flooded systems.

Oct. 30—Service complaints and remedies on Type 1A flooded systems—continued.

Nov. 6—Service operations on type 1A flooded systems.

Nov. 13—Service operations on Type 1A flooded systems—continued.

Nov. 20—Service Operations on Type 1A flooded systems—concluded.

Nov. 27—Service complaints and operations on Type 1B and 1C flooded systems.

Service Operation No. 10:
Flushing the Float Valve
a. Proceed as in operation 10, type "1A."

Service Operation No. 11:
Changing Float Valve (Ball Type)
a. Proceed as in operation 11 type "1A" through steps a, b, c, d, e, and f.
b. Close valve No. 1.
c. Disconnect liquid and suction lines from evaporator connections.
d. Remove present float valve.
e. Reconnect liquid and suction lines.
f. Purge liquid line, evaporator, and suction line.
g. Test for leaks, at 35 lb. pressure.
h. Open valves Nos. 1 and 3 and put system into operation.

Service Operation No. 12: Changing Cartridge-type Needle-seat Assembly (See Figs. 91 and 92.)

a. Proceed as in operation 11, type "1A" through steps a, b, c, d, e, and f.
b. Remove liquid line from evaporator connection if necessary.
c. Remove evaporator connection.
d. Remove needle-seat assembly and install new one, as described on Page 77 of the Introduction.
e. Reconnect liquid line.
f. Purge liquid line, evaporator, and suction line as in operations 3 and 4.
g. Test for leaks at 35 lbs. pressure.
h. Open valves Nos. 1 and 3 and put system into operation.

Service Operation No. 13: Removing Oil from an Oil Logged Evaporator

a. Proceed as in operation 11 type "1A," through steps a, b, c, d, e, and f.
b. Disconnect liquid and suction lines from evaporator.
c. Remove evaporator from refrigerator to the outside.
d. Remove the float valve, and pour all the oil from the evaporator.
e. Install a new float valve that is correctly calibrated.
f. Reinstall evaporator in refrigerator.
g. Reconnect liquid and suction lines.
h. Purge liquid line, evaporator, and suction line.
i. Test for leaks at 35 lbs. pressure.
j. Open valves Nos. 3 and 1 and put system into operation.
k. Refer to note in operation 13, type "1A."

Service Operation No. 14: Changing the Discharge Valve

a. Same as operation 14, type "1A."

Service Operation No. 15: Changing the Compressor Body

a. Same as operation 15, type "1A."

Service Operation No. 16: Changing Liquid Line Filter at Valve No. 3

a. Proceed as in operation 11 type "1A," through steps a, b, c, d, e, and f.
b. Close valve No. 1.
c. Remove filter and replace with new one.
d. Purge as in operation 3.
e. Test for leaks at full high side pressure.

f. Open valves Nos. 1 and 3 and put system into operation.

Service Operation No. 17: Changing Liquid Line Filter Outside of Connection on Evaporator

a. Evacuate liquid line, evaporator, and suction line as in operation 11, type "1A." Close valve No. 1 and remove old filter. Replace with new filter as in operation 16, steps c, d, e, and f.

b. If filter is completely clogged, install pinch-off block in liquid line just ahead of the filter.

c. Pinch-off the line.

d. Evacuate evaporator.

e. By-pass pressure up to 0 lbs.

f. Remove old filter and replace with new one.

g. With valve No. 3 closed and valve No. 1 open, remove pinch from the line.

h. Draw pressure back to 0 lbs.

i. Remove line from filter and re-flare just below pinch, removing pinch from the line.

j. Reconnect liquid line to filter.

k. Purge liquid line and evaporator and suction line.

l. Test for leaks.

m. With valves Nos. 1 and 3 open, put system into operation.

Service Operation No. 18: Changing the Float Valve Strainer

a. Install pinch off block in liquid line as in operation 17 and proceed as in 17, except to replace or remove float valve strainer instead of outside filter.

Service Operation No. 19: Adjusting the Low Pressure Control

a. Same as operation 19, type "1A."

Service Operation No. 20: Changing the Stuffing Box Seal

a. Same as operation 20, type "1A."

Service Operation No. 21: Changing the Low Pressure Control

a. Same as operation 21, type "1A."

Service Operation No. 22: Changing the Complete Condensing Unit

a. Proceed as in operation 11, type "1A," through steps a, b, c, d, e, and f.

b. Close valve No. 1.

c. Both the liquid and suction lines may now be disconnected.

d. Remove present condensing unit and install new one.

e. Reconnect liquid and suction lines.

f. Purge line and test for leaks.

g. Open valves Nos. 1, 2, and 3 and put system into operation.

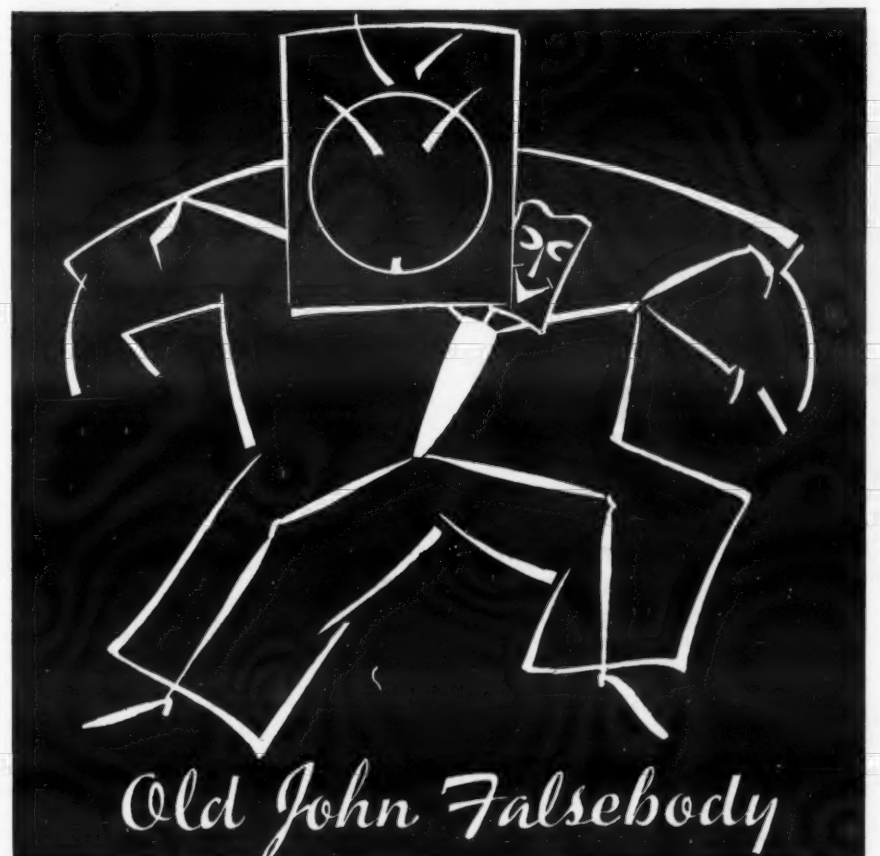
Service Operation No. 23: Discharging Condenser and Liquid Receiver

a. Same as operation 23, type "1A."

Service Operation No. 24: Pumping All Refrigerant from Condensing Unit into Refrigerant Cylinder

a. As the evaporator charge must first be pumped down into the receiver before the liquid line may be disconnected, this operation on type "1B" system is omitted in favor of operation 25.

(Continued on Page 17, Column 1)



Old John Falsebody

I'm a clever crook, I am. My appearance deceives you. I look like I'm a big, husky guy, but it's just my clothes—I'm thin underneath.

I'm the guy that fools you as a refrigerator finish. You think I'm on in a nice, full-bodied coat, but I'm not. I soil quickly and it's dangerous to clean me—I'm so thin, I soon wear off, and then I have to laugh when the guy who sold the box catches the devil.

There's something making me mad, however. This Bradley-Vrooman outfit has been on my trail. They're telling people that I'm not as smooth as I think I am, and they put out something in competition they call HIGH BAKE PORCELOID. It goes on like glass and just as lustrous and it's just as full-bodied as it looks.

But listen, Mr. Dealer and Distributor, don't forget you might have to fire your complaint adjuster if you use that stuff and he's got to live too, so whatever you do, be a good fellow and disregard the coupon at the bottom of this Ad.

BRADLEY & VROOMAN CO.
2629 S. Dearborn St.,
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Please send me information regarding actual tests that prove HIGH BAKE PORCELOID to be superior to all other Ice or Electric Refrigerator Finishes.

Firm Name

Address

By

AIR CONDITIONING

Standard Tests & Ratings for Humidifiers & Definitions of Terminology

(Concluded from Page 14, Column 5)

shall not be greater than plus or minus 5 per cent.

(b) Confirming test. The heat abstracted from the hot water will be

$$Q_w = 60LC(t_w - t_{w2}) \quad (7)$$

If the fan motor is not in the air stream the heat added by the fan will be

$$Q_f = 3.42NE_m \quad (8)$$

and if the fan motor is in the air stream the heat added by the fan will be

$$Q_f = 3.42N \quad (9)$$

and the confirming heating effect will be

$$Q_{sc} = Q_w + Q_f - Q_1 \quad (10)$$

The deviation between the primary test and confirming test heating effect,

$$\Delta Q_s = 100 \left| \frac{Q_{sc} - Q_s}{Q_s} \right| \quad (11)$$

shall not be greater than 5 per cent.

G. Testing Humidifying Equipment

G. Testing Humidifying Equipment.

1. Basis of Test. Tests shall be made at the Standard Basis of Rating. Corrections from other conditions will not be allowed.

a. Primary Test which is to be used for the rating. The air capacity shall be determined by direct measurement, by one of the methods specified under D2, "Apparatus for Air Measure-

ments." The water evaporation rate shall be determined by measurement of the weight of water evaporated. An exception to this is in the case of the recirculating spray system, in which case the confirming test outlined below may be used as the primary test for rating.

b. Confirming Test. The evaporation rate shall be obtained by measurement of the increase in the moisture content of the air as determined by wet and dry bulb thermometer readings. The results must be within 5 per cent of those of the primary test, but the primary test shall govern the rating.

2. Procedure

a. The Air Flow through the unit when corrected to standard air conditions shall be the air capacity given in the rating, and shall be held constant during the test. It shall be measured by one of the following methods.

(1) Receiving chamber with impact nozzle. The static pressure in the receiving chamber as indicated by the static pressure manometers shall be maintained at zero for free delivery units. This shall be done by controlling the exhaust fan. The manometers for measuring the pressure across the nozzle shall be read to within 0.005 inches of water each time a general reading is made. This reading should immediately precede or immediately follow the reading of the outlet air temperature.

(2) Receiving chamber with static nozzle. The static pressure in the mixing chamber as indicated by the static pressure manometers shall be maintained at zero for free delivery units. This shall be done by controlling the exhaust fan. The manometers for measuring the pressure across the nozzle shall be read to within 0.005 inches of water each time a general reading is made. This reading should immediately precede or immediately follow the reading of the outlet air temperature.

b. The Inlet Air shall be at the conditions specified in the Standard Basis of Rating. The dry bulb temperature and the wet bulb temperature shall not vary more than 0.5° F. from the specified during the run. The instruments measuring the inlet and outlet air temperatures shall be read to 0.1° F. All wet bulb instruments must be in evaporative equilibrium when read. Wet bulb readings shall be corrected where air velocities are below 500 feet per minute.

c. The Weight or Volume of Water evaporated in a measured time shall be determined by the most accurate means available at least three times during the test. The permissible deviation shall be 5 per cent from the mean.

d. The temperature of the water supplied for humidification shall be

taken at the inlet to the unit. The instrument shall be read to 0.5° F.

e. If Heat must be supplied for evaporation, suitable readings shall be taken to determine the amount of this heat.

f. Information relating to the source of this heat such as steam pressure, hot water temperature, voltage, etc. shall be obtained by readings taken during the test.

g. Fan speed shall be maintained within plus or minus 2 per cent of rated speed and the speed shall be measured at the beginning and the end of the test.

h. Watts Input to the fan motor (and pump motor, if any) shall be taken at the beginning and at the end of the test by a watt meter.

i. Barometric Pressure shall be read once during the test.

j. Spray Pressure shall be measured every 10 minutes if no pump is regularly furnished with the unit.

k. Duration of Test during which all conditions shall be maintained within the previously specified limits, shall not be less than one hour. If conditions fluctuate beyond the specified limits, the test shall be continued until the readings have been stabilized within those limits for a period of one hour.

l. Readings shall be taken at least every 10 minutes unless specified to the contrary, and a total of at least seven readings shall be taken.

3. Calculation of Results

a. Symbols.

Primary symbols in addition to those previously given in the sections on cooling and heating are:

"F" Weight of water evaporated during timing periods, pounds.

"u" Duration of evaporation timing period, minutes.

"V_w" Volume of water evaporated during timing period, cubic feet.

"W_w" Water evaporated per hour, pounds.

b. Formulas.

(1) Primary test. The outlet air flow will be

$$c.f.m._2 = 1098AK(P \cdot V_2)0.5 \quad (1)$$

V₂ should be obtained from the psychrometric chart and substituted in the following to correct the air capacity to standard air conditions.

$$c.f.m._2 = \frac{c.f.m._1}{0.07488V_2} \quad (2)$$

The test was run with the rated air flow, therefore

$$c.f.m._2R = c.f.m._2 \quad (3)$$

If the weight method is used, the water evaporation rate will be

$$W_wR = \frac{F}{u} \quad (4)$$

If the volume method is used, the water evaporation rate will be

$$W_wR = \frac{60(62.4)(V_w)}{u} \quad (5)$$

(2) Confirming test. The air weight flow is

$$G_2 = \frac{c.f.m._2}{V_2} \quad (6)$$

Obtaining the moisture content of the inlet and outlet air from the psychrometric chart by the wet and dry bulb readings, the confirming water evaporation rate will be

$$W_w = G_2(H_2 - H_1) \quad (7)$$

The deviation between the results of the primary and confirming tests,

$$\Delta W_w = 100 \left| \frac{W_w - W_wR}{W_wR} \right| \quad (8)$$

shall not be greater than 5 per cent.

Definitions

1. A Unit is a factory made enclosed assembly of the functional elements indicated by its name, such as air conditioning unit, room cooling unit, humidifying unit, etc.

2. An Air Conditioning System provides ventilation, air circulation, air cleaning, and equipment for maintaining temperature and humidity within prescribed limits.

3. An Air Conditioning Unit is a specific air treating combination consisting of means for ventilation, air circulation, air cleaning, and heat transfer with control means for maintaining temperature and humidity within prescribed limits.

4. A Cooling Air Conditioning Unit is a specific air treating combination consisting of means for ventilation, air circulation, air cleaning, and heat transfer with control means for cooling and maintaining humidity within prescribed limits.

5. A Heating Air Conditioning Unit is a specific air treating combination consisting of means for ventilation, air circulation, air cleaning, and heat transfer with control means for heating and maintaining humidity within prescribed limits.

6. A Cooling Unit is a specific air treating combination consisting of means for air circulation and cooling within prescribed temperature limits.

7. A Heating Unit is a specific air

treating combination consisting of means for air circulation and heating within prescribed temperature limits.

8. A Humidifying Unit adds water vapor to and circulates air in a space to be humidified.

9. A Dehumidifying Unit removes water from and circulates air in a space to be dehumidified.

Self-Contained Air Conditioner

10. A Self-Contained Air Conditioning or Cooling Unit is one in which a condensing unit is combined in the same cabinet with the other functional elements.

11. A Free Delivery Type Unit takes in air and discharges it directly to the space to be treated without external elements which impose air resistances.

12. A Pressure Type Unit is for use with one or more external elements which impose air resistance.

13. An Air Heat Interchanger effects a transfer of heat between air and a heating or cooling medium.

14. Comfort Air Conditioning provides ventilation, air circulation, air cleaning, and maintains temperature and humidity for the comfort of people.

15. Commercial Air Conditioning provides ventilation, air circulation, air cleaning, and maintains temperature and humidity for the benefit of products or industrial processes.

16. The Total Cooling Effect of a Unit is the difference between the total heat content of the dry air and water vapor mixture entering the unit per hour and the total heat content of the dry air and water vapor mixture leaving the unit per hour expressed in B.t.u. per hour.

Dehumidifying Effect

17. The Dehumidifying Effect of a Unit in B.t.u. per hour is the difference between the moisture content in pounds per hour of the entering and leaving air multiplied by 1060.

18. The Sensible Cooling Effect of a Unit in B.t.u. per hour is the difference between the total cooling effect and the dehumidifying effect.

19. The Sensible Heating Effect of a Unit in B.t.u. per hour is the difference between the sensible heat of the air leaving the unit and the sensible heat of the air entering the unit.

20. The Humidifying Effect of a Unit in B.t.u. per hour is the latent heat of vaporization at the average evaporating temperature times the number of pounds of water evaporated per hour.

21. Standard Air is air weighing 0.07488-pound per cubic foot which is air at 18° F. dry bulb and 50 per cent relative humidity at a barometric pressure of 29.92 inches of mercury, or approximately dry air at 70° F. at the same pressure.

22. Evaporative Equilibrium of a wet bulb instrument is the condition attained when the wetted wick has reached a stable and constant temperature. When the instrument is exposed to air at velocities over 500-ft. per min. this temperature may be considered the true wet bulb temperature. Mean error in wet bulb temperature expressed in per cent of the observed wet bulb depression at wet bulb temperatures between 50° and 80° F. according to 1924 A.S.M.E. paper by W. H. Carrier and D. C. Lindsay, "The Temperatures of Evaporation of Water into Air," page 19, is as given in Table 7.

23. A Volatile Refrigerant changes from the liquid to the vapor phase in the process of absorbing heat within the unit or air interchanger.

24. A Non-Volatile Refrigerant remains a liquid in the process of

absorbing heat within the unit or air interchanger.

25. Forced Air Circulation is that caused by difference in pressure produced by a fan or blower.

Central System Used in Manchester Theater

MANCHESTER, N. H.—Installation of a central plant air-conditioning system with concealed ducts makes the Empire Theater here the only New Hampshire theater that is completely air conditioned. Phelps & Shephard, Inc., Westinghouse dealer, designed and installed the system.

Tyler, Texas, Coffee Shop Installs 10-Hp. Unit

TYLER, Tex. — Air-conditioning equipment recently installed in the Coffee Shop of the Blackstone hotel here includes a 10-hp. Freon machine and a C-1500 York air conditioner. Installation was made by Walter Connolly Co., Tyler distributor for York.

Table 7

Air Velocity Over Wet Bulb F.p.m.	Error Per Cent
2,000.....	0.6
1,000.....	0.9
500.....	1.4
200.....	2.5
100.....	4.0
50.....	6.0

absorbing heat within the unit or air interchanger.

25. Forced Air Circulation is that caused by difference in pressure produced by a fan or blower.

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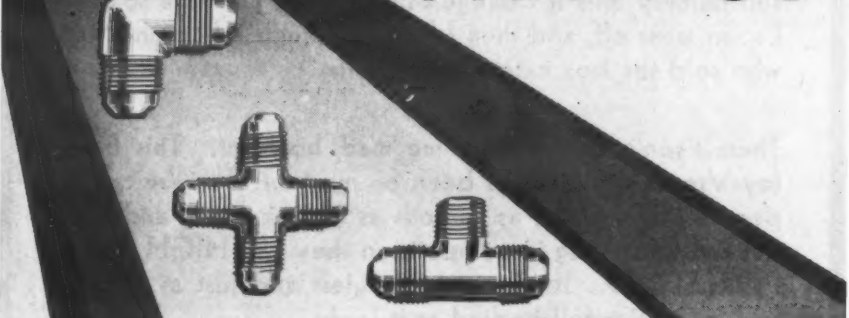
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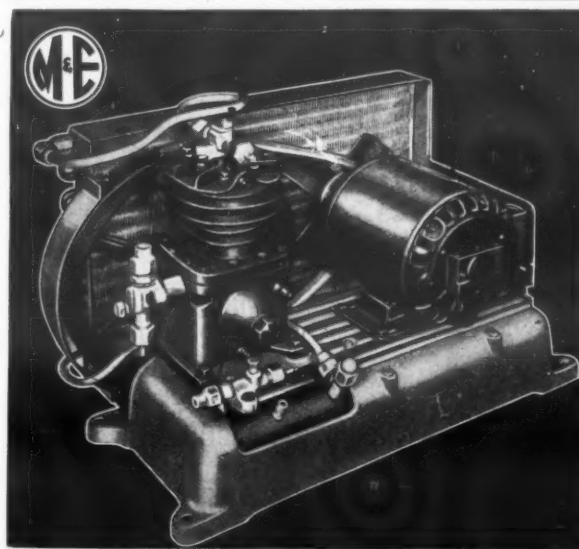
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Complaints, Operations On Type 1C Systems

(Continued from Page 15, Column 5)

Service Operation No. 25: Pumping All Refrigerant from Entire System Into Empty Refrigerant Cylinder; Or Evacuating Entire System

a. Same as operation 25, type "1A."

Service Operation No. 26: Adding Liquid Refrigerant to Condenser and Liquid Receiver

a. Same as operation 26, type "1A."

Complaints on Type '1C' Flooded Systems

Type "1C" is the same as type "1A" except that it employs the thermostatic control, instead of the low pressure control.

Type "1C" is equipped with evaporator shut-off valves Nos. 4 and 5.

Some of the service complaints on the type "1C" system differ from the complaints on types "1A" and "1B" as the system responds differently when being controlled by a thermostat, thereby changing in some instances the entire nature of the complaint and diagnosis.

Complaint No. 1: Compressor Does Not Run Much. Evaporator Is Defrosting

Like complaint 1 under type "1A" it is apparent that there is a lack of refrigeration.

The thermostatic control should keep the compressor operating until the proper temperature is reached. If it does not, such as in this case, it should be checked for a possible loss of the charge of thermostatic liquid from the bulb and power element. This may be determined by attempting to flex the power element bellows with the fingers. If it flexes easily with the bulb warm it has lost its charge and must be replaced.

Check the overload relay and inquire of the user if it has been tripping off excessively. If this is found to be the case, check the head pressure, oil level in crankcase, motor bearings, and all other causes of an overload on the motor. Check the overload relay heater coil for the correct size.

Check the cold control setting as there is a possibility the user has left it on "Defrost" or on too warm a setting.

Place a thermometer in direct contact with the control bulb and check the temperature. If it is too high and control trips off, set the control holder. If unable to obtain correct adjustment on control, replace it with a new one.

Complaint No. 2: Compressor Runs Continuously But Ice Does Not Freeze

This complaint would indicate that the thermostat is keeping the compressor operating, but for some reason the evaporation taking place is insufficient to reduce the evaporator temperature to the desired point.

Note the head pressure and back pressure. If the head pressure is low and the back pressure high, with a noise at the float valve, a shortage of refrigerant exists. Sufficient refrigerant should be added to bring the pressures back to normal and seal the float valve.

If the head pressure is low and the back pressure higher than normal with no noise at the float valve, test the discharge valve for leaks. If it is found leaking, repair or replace it.

A broken or badly worn piston valve would render the compressor inefficient and would result in long or continuous operation with little or no refrigeration.

High head pressure from air in the system or restricted air circulation to the condenser will also reduce the efficiency of the compressor to result in long or continuous operation with little refrigeration.

If the head pressure is normal or lower than normal and the back pressure is extremely low, it is evident that there is a restriction somewhere in the refrigerant circuit. Check all valves to make sure they are open to their normal operating positions. Check all filters and strainers for restriction or complete stoppage. Replace any filters or strainers that are clogged or partially clogged.

An oil logged evaporator may partially defrost even under continuous operation. Usually an oil logged evaporator frosts unevenly.

Another test for an oil logged evaporator is to close valve No. 4 and operate compressor carefully, noting the compound gauge. If the pressure increases suddenly at irregular intervals during operation, it may be laid to refrigerant breaking through the heavy blanket of oil. If the evaporator is oil logged it should be dumped, as in service operation 13.

Moisture in the refrigerant where isobutane, methyl chloride or Freon is used may freeze at the float needle, restricting the flow of refrigerant.

To distinguish between moisture in the system causing restriction and a clogged filter or strainer, stop the

Type '1C' Flooded System

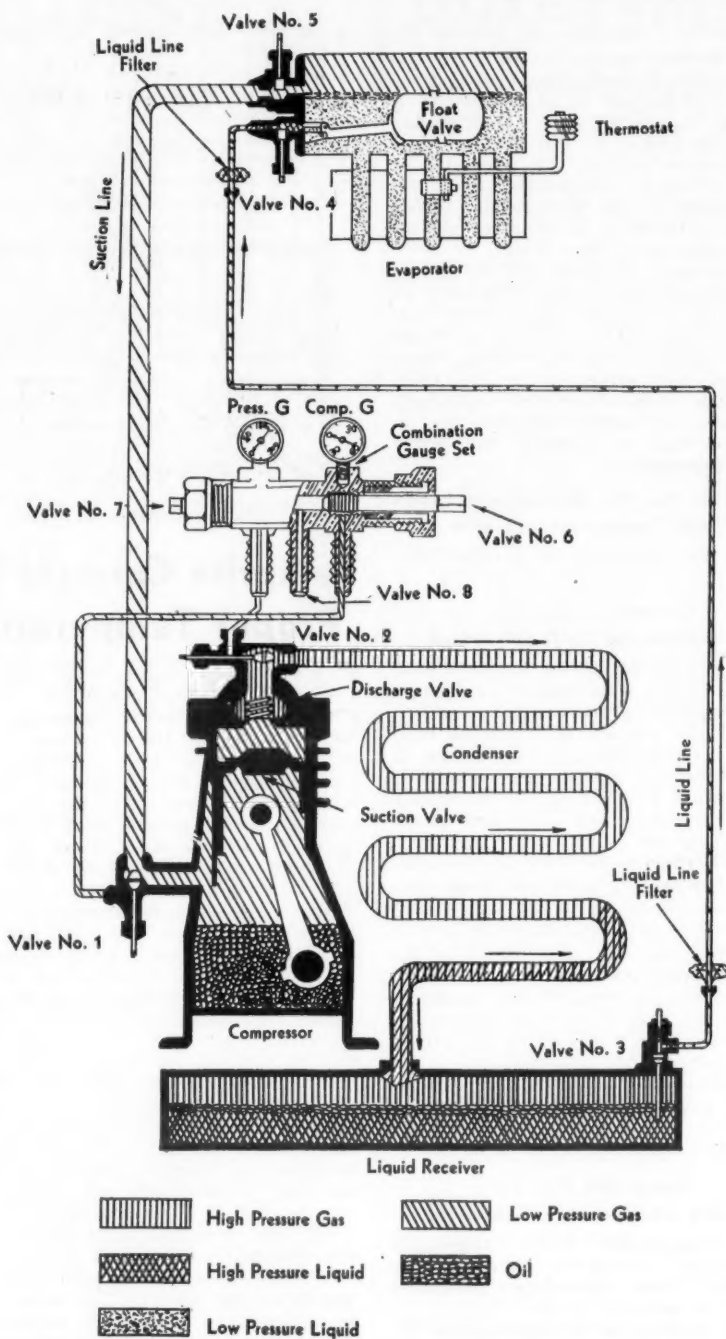


Fig. 137—Type 1C flooded system using low side float valves, thermostatic control, and having two evaporator service valves No. 4 and No. 5. Service information on these systems will be covered in later instalments.

compressor and apply heat to the float valve header. Continue to heat the header until the frost melts off. If the stoppage is caused by ice at the float needle, the ice will melt under the heat and the low side pressure will suddenly increase, as the liquid starts to flow into the evaporator.

Moisture may be removed from the system by installing a dehydrator in the liquid line. The moisture will be absorbed by the drying agent in the dehydrator as the moisture laden refrigerant flows through the dehydrator.

Complaint No. 3: Trays or Metal Parts Inside of Refrigerator Tarnished

Same as complaint 3 in type "1A" system.

Complaint No. 4: Costs Too Much to Operate

This complaint may be due to the thermostat being set "too cold," maintaining a lower than necessary evaporator and refrigerator temperature. Check the temperature with an accurate thermometer and set control warmer if found necessary.

Check carefully the contact between the bulb and the evaporator. If the thermal contact is bad, the thermostatic bulb may not be responding directly to the evaporator temperature, but partially to the refrigerator temperature. The clamp or device for maintaining this contact should be tight, both at the point of contact with the bulb, and with the evaporator.

Water soaked insulation in the cabinet will materially increase the refrigeration demand and increase operating costs.

Loosely fitting doors and worn out door gaskets will result in unnecessary heat leakage and increase operating time.

Excessive freezing of ice cubes or desserts, with necessitated colder regulation on the control, will affect the operating cost.

Placing hot foods in the refrigerator runs up the electric bill. Foods should be allowed to cool to room temperature before being placed under refrigeration.

All causes of excessive operating head pressure as given in complaint 4, type "1A," and conditions imposing an overload on the motor should be checked as possible causes of increased operating cost.

It is possible that the user may have an erroneous impression of the actual operating cost of the refrigerator.

It is also possible in cases of large families, that meals may be served at all hours and the refrigerator may be used considerably more than for small families. In the case of the large family, the same make and model of refrigerator might show an appreciable increase in operating cost, above that of the smaller family.

Complaint No. 5: Compressor Noisy

Same as complaint 5 given in type "1A."

Complaint No. 6: Ice Freezes, But Food Spoils

Same as complaint 6 in type "1A."

Complaint No. 7: Food Has Peculiar Taste

Same as complaint 7 in type "1A."

Complaint No. 8: Motor Starts and Stops Too Much

This complaint would indicate that the thermostat is cutting in and out at too short intervals. A poor or irregular thermal contact between the bulb and evaporator may cause this condition.

The capillary tube from the bulb to the power element may be touching the cold evaporator causing irregular operation of the control.

The control may be out of adjustment, and the differential may be set too close. The differential in most controls is adjustable. The adjustment should be made and the correct cut-in and cut-out temperatures noted on a thermometer placed in direct contact with the thermostatic bulb.

The condition might also be traced to a loose electrical connection, on or near the motor, which is making or breaking with the vibration of the condensing unit.

Complaint No. 9: Blowing Fuses or Overload Relay Continues to Cut Out

Same as complaint 9 in type "1A."

Complaint No. 10: Compressor Knocks

See complaint 5, "compressor noisy."

Complaint No. 11: Compressor Runs Continuously; Noise Inside of Cabinet

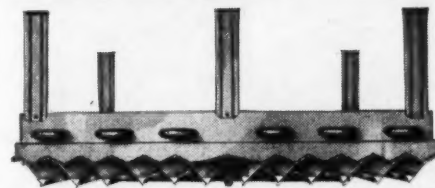
Continuous operation of the compressor would indicate that insufficient evaporation is taking place. The noise inside the cabinet would suggest that the float valve is holding open.

With the float valve open the low

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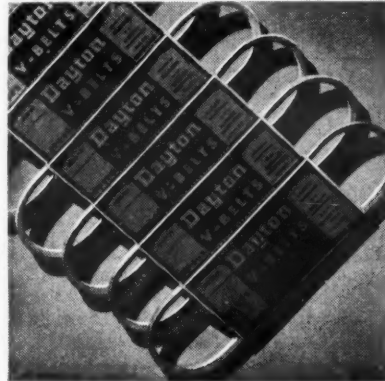


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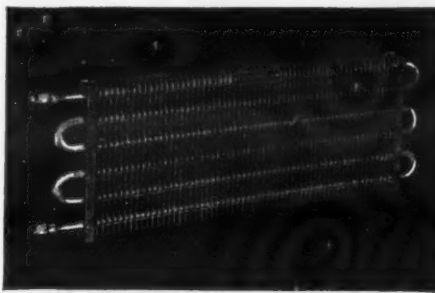
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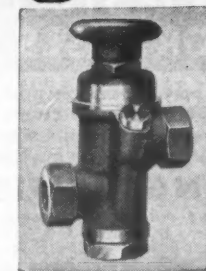


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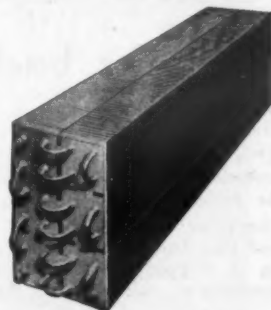
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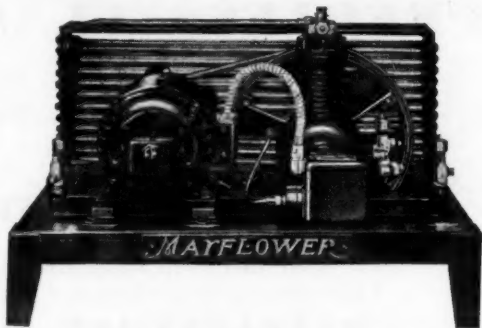
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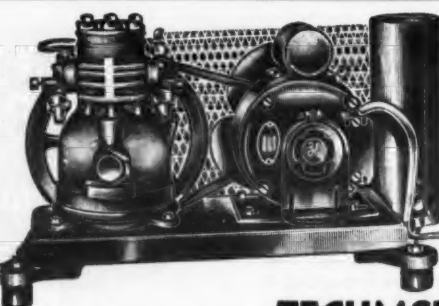
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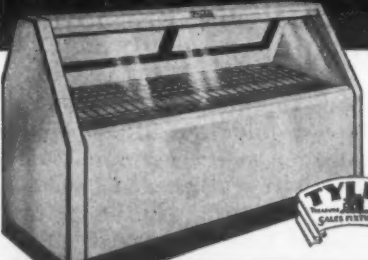


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Complaints, Operations On Type '1C' Systems

(Concluded from Page 17, Column 3)
side pressure would be high. If the
suction line is warm or normal tem-
perature the float is open, due to a
shortage of refrigerant. Refrigerant
should be added to the system until
the pressure returns to normal and
the float closes, eliminating the noise.
The system should be carefully tested
for leaks, for if it is short of refrig-
erant there must be a leak.

The noise at the float may be caused
by a leaking float valve. This may be
noticed by a frosted suction line, out-
side the refrigerator. The float should
first be flushed and if flushing does
not seal the valve, bring the frost
line inside the refrigerator, eliminate
the noise, and return the pressure on
the low side to normal, the valve
must be changed.

Complaint No. 12: Refrigerant Leaks When Compressor Is Idle

Same as complaint 12 in type "1A."
"1A."

Complaint No. 13:

Food Freezing In Refrigerator

This complaint would indicate that
the thermostat is keeping the compres-
sor operating excessively.

Check the contact between the bulb
and the evaporator. If the clamp is
loose or broken the thermostatic bulb
is not being affected by the extremely
cold evaporator, and does not reach
the cutting out point.

The thermostat may be set too cold.
Check the setting with a thermometer
placed in contact with the thermostatic
bulb, and adjust to the correct tem-
perature.

The control contacts may be stuck
closed from arcing. If the contacts
are burned, they should be cleaned or
replaced where possible, or the entire
control should be replaced.

A ground in the control circuit or
control proper would keep the motor
operating even though the contacts
were open.

Complaint No. 14:

Set Refrigerator Colder

The evaporator and refrigerator
temperature should be checked very
carefully. The operating pressures
should be noted.

Most complaints of this nature are
caused by some other condition as
given in previous complaints.

If after checking all other causes
of high refrigerator temperatures the
refrigerator temperature is still high
the control may be set colder.

Complaint No. 15:

Machine Will Not Run

Same as operation 15 in type "1A."

Complaint No. 16:

Refrigerator Not Cold Enough

Proceed as in complaint 14.

Complaint No. 17:

Will Not Freeze Ice

Same as complaint 17, in type "1A."

Complaint No. 18: Lines Frosting, Water Dripping On Floor

Same as complaint 18, in type "1A."

Complaint No. 19: Refrigerator Motor Causing Radio Interference

Same as complaint 19, in type "1A."

Complaint No. 20: Motor Runs Hot

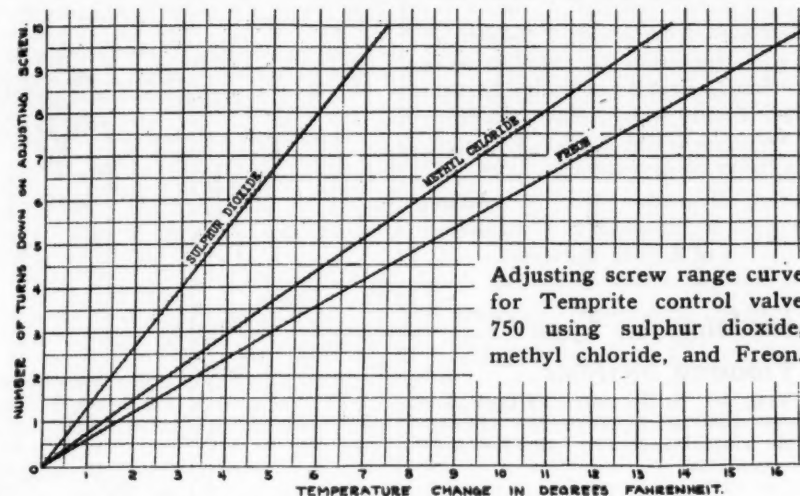
Same as complaint 20, in type "1A."

Service Operations on Type '1C' Systems

Service operations on type "1C"
systems are the same as on type "1A."
Except where reference is made to the
low pressure control, it is to be as-
sumed that the thermostatic control
is to be dealt with.

It is also necessary to omit service
operations dealing with adjusting and
changing low pressure control, and to
substitute instruction given in Chapter
6 on care and adjustment of thermo-
static controls.

Range of Adjusting Screw



Adjusting screw range curve
for Temprite control valve
750 using sulphur dioxide,
methyl chloride, and Freon.

Temprite Corrects Setting of Valves to Give Proper Temperature at Required Altitude

By H. B. McLaughlin, Chief Engineer, Temprite Products Co.

CONTROL of exit beverage tem-
perature in the Temprite cooler
is accomplished by controlling the
temperature of the refrigerant bath in
which the beverage coils are sub-
merged. Under normal load conditions
there is a difference of 4° between
the exit beverage temperature and
the temperature of the refrigerant.
Thus, if it were required to furnish
water or beverage from the cooler at
40°, the refrigerant bath would be
maintained at a temperature of 36°.
Full rated capacities are obtained
under this condition.

Control of the temperature of
the refrigerant is obtained by con-
trolling the suction pressure within
the cooler, because there is a direct
relationship between suction pressure
and refrigerant temperature; and, as
long as the correct suction pressure
can be maintained, the refrigerant
temperature will also be correct.

Suction pressure is controlled by
the Temprite regulating valve which
is connected to the suction line lead-
ing from the cooler. The valve itself
is operated by a bellows which is in
direct communication with the gas in
the cooler and is opened when the
pressure in the cooler rises, thus per-
mitting the compressor to again
lower the pressure. The valve is so
sensitive that there is no appreciable
change in pressure in the cooler dur-
ing this operation.

The opening of the valve is opposed
by a spring on top of the bellows.
Thus, to produce a higher tempera-
ture in the cooler the tension on the
spring is increased, which results in
maintaining a higher pressure in the
cooler before the valve will open. Con-
versely, if the tension on the spring
is reduced, a lower pressure in the
cooler will open the valve and a lower
temperature will consequently be
maintained.

In addition to the gas pressure on
the inside of the bellows and the
spring pressure on the outside, the
valve is also affected slightly by at-
mospheric pressure because the at-
mosphere is acting on the outside of
the bellows and an increase in at-
mospheric pressure, therefore, has the
same result as increasing the tension
on the regulating spring.

In other words, an increase in
atmospheric pressure tends to raise
the temperature at which the cooler
will operate and a reduction in at-
mospheric pressure tends to lower it.

For example, the altitude at Denver,
Colo., is 5,000 feet above sea
level, and the average atmospheric
pressure there is 2.7 lbs. per square
inch lower than at sea level.

Therefore, a Temprite cooler oper-
ating in Denver would have to have
the tension on the control valve ad-
justing spring increased by an amount
sufficient to make up for the 2.7 lbs.
per square inch reduction in at-
mospheric pressure, if it were to main-

tain the same refrigerant tempera-
ture as a cooler with its control valve
subjected to the higher atmospheric
pressures which are found at sea level.

Unless otherwise specified, all
Temprite cooler control valves are set
at the factory to maintain a 36° re-
frigerant temperature in the cooler at
500 feet altitude, which is the eleva-
tion at Detroit. As pointed out before,
the 36° refrigerant temperature pro-
duces a 40° exit beverage tempera-
ture.

The control valve settings necessary
to give this temperature are, as shown
by table No. 1, 8.6, 24.4, and 31.3 lbs.
per square inch for sulphur dioxide,
methyl chloride and Freon, respec-
tively, at 500 feet altitude.

Table No. 1 also shows the control
valve settings which would be neces-
sary to produce this same tempera-
ture for any other elevation.

For example, at 5,000 feet elevation
the pressures should be 11, 26.7, and
33.6 lbs. for the three different re-
frigerants. As shown in the tempera-
ture column of the chart, this will
give a higher refrigerant temperature
as long as the cooler is operated at
the low altitude, but will give a 36°
refrigerant temperature when operated
at the 5,000 foot elevation.

The foregoing method shows how
the control valve on a cooler located
at Detroit must be compensated be-
fore shipment to a higher altitude if
it is to produce the proper tempera-
ture at the higher place. The next
problem is the question of the pres-
sure which the compound gauge at
the higher altitude should read when
coolers are actually checked on the
job. In this connection it is found
that no matter at what altitude the
gauge reading is taken it should still
be the same as shown in the column
on the chart for the corresponding
elevation.

This is due to the fact that the
compound gauge does not read abso-
lute pressure, but always shows
the amount by which the pressure at
which it is connected is above or
below the atmospheric pressure at the
elevation at which the gauge is in-
stalled.

Thus, if a service man at Detroit
were setting a sulphur dioxide cooler
control valve which he wanted to de-
liver a 36° refrigerant on a cooler
installed at 5,000 feet elevation, he
would set the valve so that the gauge
would read 11 lbs. pressure. If, after
arriving at the point of higher eleva-
tion, the control valve were again
checked by a compound gauge it would
still read 11 lbs. on the gauge at that
point and the refrigerant tempera-
ture would be 36°.

In other words, in order to make a
Temprite cooler operate with 36° re-
frigerant which in turn corresponds
to a 40° exit beverage, the control
valve should be set for the pressure
shown opposite the altitude on table
No. 1 and the cooler will deliver this
temperature when taken to the alti-
tude in question, regardless of the
altitude at which the setting was
originally made.

If a pressure gauge is not available
for making control valve adjustments
the compensation for change in alti-
tude can still be made by use of table
No. 2. This table shows the number
of turns which must be made on the
adjusting screw to produce a cor-
responding change in temperature in
the cooler. For example, chart No. 1
shows that when a cooler set to main-
tain a 36° refrigerant temperature at
500 feet elevation is raised to 5,000
feet elevation, the temperature setting
should be increased 4.1°.

Reference to the sulphur dioxide
curve on table No. 2 shows that a
4.1° change in temperature can be
produced by turning the adjusting
screw 5½ turns downward. In other
words approximately 1¼ turns on the
adjusting screw equals 1° change in
temperature.

For methyl chloride a .7 turn equals
1°, and for Freon .6 turn equals 1°.

Altitude Correction Chart for Temprite Valves

Altitude In Feet	Sulphur		Methyl		Freon	
	Temp.	Press.	Temp.	Press.	Temp.	Press.
Sea Level	35.5	8.3	35.5	24.0	35.5	31.0
500	36.0	8.6	36.0	24.4	36.0	31.3
1,000	36.5	8.9	36.5	24.7	36.3	31.6
1,500	37.0	9.2	36.8	25.0	36.6	31.9
2,000	37.5	9.4	37.1	25.3	36.9	32.2
2,500	38.0	9.8	37.5	25.6	37.2	32.4
3,000	38.5	10.0	37.8	25.8	37.4	32.6
3,500	38.9	10.2	38.2	26.0	37.7	32.9
4,000	39.3	10.5	38.5	26.3	38.0	33.2
4,500	39.7	10.7	38.8	26.5	38.2	33.4
5,000	40.1	11.0	39.0	26.7	38.5	33.6
5,500	40.5	11.2	39.3	27.0	38.7	33.9
6,000	40.9	11.4	39.6	27.2	39.0	34.1
6,500	41.3	11.7	39.9	27.5	39.2	34.3
7,000	41.6	11.9	40.2	27.7	39.5	34.5
7,500	42.0	12.1	40.5	28.0	39.7	34.7
8,000	42.3	12.4	40.8	28.2	40.0	35.0

Temperature column shows minimum refrigerant temperature setting at Detroit
500 ft. altitude to maintain 36° F. refrigerant temperature at various altitudes.

Pressure column shows cooler operating pressure to maintain a 36° F. refrigerant
temperature at various altitudes. 36° F. refrigerant temperature corresponds to 40° F.
exit beverage temperature.

Example—A cooler in operation at 3,000 ft. altitude will have a cooler gauge
pressure of 10 lbs. for sulphur, 25.8 lbs. for methyl, and 32.6 lbs. for Freon.

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1 subscription	\$3.00	\$5.00	\$6.00
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11-27-35

QUESTIONS

Contract Forms Chart

No. 2572 (Manufacturer, Pennsylvania)—“Some time ago you published a chart which gave the definite types of contract forms that had been found to be the best to use in the various States of the Union. This chart also gave such data as whether the contract must be recorded, etc.”

“I would like to secure two copies of this chart and would also like to know whether it is up-to-date and if not, what the date of the last revision was.”

Answer: A chart giving the definite types of contract forms that had been found satisfactory to use in the various States was published on pages 12 and 13 of the February 8, 1933 issue of ELECTRIC REFRIGERATION NEWS.

At the time this chart was published it was made plain that due to changes being made in the statutes of the various states that a good part of the chart would be out-of-date within a year or two. The chart was prepared for the Commercial Credit Co., 100 E. 42nd St., New York City, by Dills, Muecke, and Schalkner, and you can probably obtain further information on this matter by writing to the Commercial Credit Co.

Sales and Production

No. 2573 (Distributor, Maryland)—“Can you supply us wholesale and retail figures for electric refrigeration units sold last year and also for 1935 to date? Can you estimate 1935 production?”

Answer: Estimated household refrigerator sales for the first nine months of 1935 are 1,529,522 units. Estimated sales during 1934 were 1,390,600 units. These are sales by manufacturers to distributors, the only way in which figures are available.

Ice Cream Cabinets

No. 2574 (Distributor, Oklahoma)—“Please give us, if you can, the names and addresses of some manufacturers of ice cream cabinets.”

“We are distributors of commercial refrigeration equipment and are interested in finding a line of ice cream cabinets which we can handle on a distributor basis. Your help in this matter will be greatly appreciated.”

Answer: Listed under various classifications on pages 200 through 206 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY are all manufacturers of ice cream cabinets.

Specifications Data

No. 2575 (Dealer, Ohio)—“Will you please furnish us retail prices, net food capacity, number of ice trays and cubes on the following refrigerators: Frigidaire, General Electric, Westinghouse, Kelvinator, Leonard, Norge, and Crosley.”

Answer: Specifications and list prices of 1935 models of household electric refrigerators were published in the March 20 and June 12 issues of ELECTRIC REFRIGERATION NEWS. Unfortunately, our supply of extra copies of these issues is now exhausted.

At the present time we are compiling specifications of all models of all makes, not only for the current year, but for all past years, to be published in a book about Feb. 1, 1936.

Valves for Ammonia

No. 2576 (Exporter, New York)—“We are interested in obtaining a source of supply for automatic and thermostatic expansion valves for use on ammonia systems.”

“We will appreciate any assistance you may be able to give us in supplying names of various concerns whom we might contact on this matter.”

Answer: Manufacturers of ammonia valves are listed on page 300 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY, but the list is not broken down by type of valves.

Market Data

No. 2577 (Manufacturer, Ohio)—“It will be quite a favor to me if you will send the latest available statistics on the electric refrigeration market. Perhaps you have devoted space to this subject in a recent issue which you could send on to me.”

“At any rate the sort of figures that I would like are the answers to such questions as:

“What is the total number of electric refrigerators in use today?”

“What is the total sales volume for the past year on electric refrigerators?”

“How does the electric refrigeration saturation compare with other electric appliances, etc.?”

Answer: Pages 56 and 57 of the 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK give sales by years from 1920 through 1934, the estimated total in use in the United States on Jan. 1, 1935, and the percentage of market saturation at that time.

An estimate of the number of refrigerators sold in the first nine months of this year is given on page 1 of the Nov. 6 issue of the News.

Data on sales and saturation points of other electrical appliances are given on pages 82 through 92 of the 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK.

Majestic Parts

No. 2578 (Service Man, Illinois)—“I would appreciate information on where I may get units for Majestic refrigerator Model 103, Serial No. 024369.”

Answer: Write to P. L. Yates, Service Manager, Grigsby-Grunow Co., 5801 Dickens Ave., Chicago, for information on Majestic refrigerator parts and service.

Report of Convention

No. 2579 (Service Man, New York)—“I would like to inquire if you reported the second annual convention of the Refrigeration Service Engineers' Society held recently in your city, and if so, in what issue?”

Answer: The R.S.E.S. convention, held in Detroit Oct. 23, 24, and 25, was reported on page 1 of the Oct. 30 issue of ELECTRIC REFRIGERATION NEWS. Back issues of the News may be obtained at a cost of 10 cents each.

Parts Makers' Addresses

No. 2580 (Manufacturer, Illinois)—“I have compiled a small list of parts and am in need of the makers' addresses, and if you will send them to me I will appreciate it. I will list the names for you: Chieftain compressors; Riley high side floats, contained in receiver; Brunner Compressor Mfg. Co.; and Emerson Electric Co.”

Answer: Chieftain compressors are manufactured by the Tecumseh Products Co., Tecumseh, Mich.; and Riley high side floats are manufactured by Riley Engineering Corp., 1481 Fourteenth St., Detroit, Mich. Address of Brunner Mfg. Co. is 1821 Broad St., Utica, N. Y., and Emerson Electric Mfg. Co. is located at 2012 Washington Ave., St. Louis, Mo.

Two-Temperature Valves

No. 2581 (Air-Conditioning Dealer, Virginia)—“If you have the address of the Automatic Valve Co., who we believe manufactures a back pressure regulating or two-temperature valve, we will be glad if you will let us have it.”

“We would also be glad to have the names of any other manufacturers of this type of equipment which you may have in your files.”

Answer: We believe you refer to the Automatic Products Co., 121 North Broadway, Milwaukee, Wis. Other manufacturers of this type of equipment are listed on page 308 of the 1935 REFRIGERATION AND AIR CONDITIONING DIRECTORY.

Information on Maxon, Inc.

No. 2582 (Dealer, Kentucky)—“Please give us information on what and where the Maxon Co., Inc., is located and what do they produce?”

Answer: Maxon, Inc., is an advertising agency, which handles the General Electric refrigerator account among others. Its main office is at 2761 East Jefferson Ave., Detroit, Mich.

Wired Homes

No. 2583 (Manufacturer, Michigan)—“Can you give me, or tell me where I might obtain, figures showing the number of wired homes in the United States for each year from 1900 to the present?”

Answer: Current data on wired homes in the United States is covered in some detail in 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK.

Data on the number of wired homes by years back to 1900 might be obtained from Edison Electric Institute, 420 Lexington Ave., New York City.

Survey for Syracuse?

No. 2584 (Distributor, New York)—“As subscribers to ELECTRIC REFRIGERATION NEWS, we would like to get some additional information on statistics appearing in 1935 REFRIGERATION AND AIR CONDITIONING MARKET DATA BOOK.”

“We note on pages 68 through 73 of the DATA BOOK detailed information on the makes of refrigerators owned in 22 cities in the United States. Is data of this kind available for Syracuse, N. Y., and would the statistics include sales for 1934?”

“What we are trying to determine is whether such a survey and ‘break down’ of sales has been made for the city of Syracuse.”

Answer: As far as we can determine neither the government nor any private agency has collected data on refrigerator ownership for Syracuse.

Officials of the R. L. Polk Co., which collected the data on refrigerator ownership for the 22 cities shown in the DATA BOOK, state that it is possible that they will collect similar information on Syracuse next year.

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RATES: Fifty words or less, one insertion \$2.00, additional words four cents each. Three insertions \$5.00, additional words ten cents each.

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REPLIES to advertisements with Box No. should be addressed to Electric Refrigeration News, 5229 Cass Ave., Detroit, Mich.

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